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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII CLEVELAND, OHIO, MAY 5, 1904 NUMBER 18

Cleveland, Ohio, April 25, 1904.

Messrs. Joseph T. Ryerson & Son,
Chicago, Ill..

Gentlemen:--

In accordance with promise made by the writer, we present herewith a description of the Cleveland Vertical Solid Frame Punches, endeavoring to make such description as brief as possible, while giving enough information to be of value to yourselves.

FIRST. MAIN FRAME OR BED CASTING. We have departed from the old custom of making cored beds, and now use only the solid frame, putting in a little more metal than we used in the cored bed.

We claim for the solid bed greater strength in proportion to weight, and absolute freedom from breakage which frequently occurs in cored beds, owing to shrinkage strains in casting, and unequal thickness of metal in the wall on each side.

SECOND. SHAFTS. Made of hammered steel, about .30 carbon, accurately ground to size.

THIRD. GEARS. Cast from metal patterns, all patterns having teeth planed from the solid on a gear planer. Our gears run smoothly; in fact they run like cut gears, but they wear longer.

The clutch teeth on gears are faced with hardened steel wearing plates, and reinforced by a steel band shrunk around the hub

FOURTH. CLUTCH AND AUTOMATIC STOP. We make all clutches of steel casting. Around the clutch is clamped an adjustable ring made in halves. The clutch carries on each side a pin backed by a spring, these pins coming into contact with the back of clutch ring. Pressure on the foot or hand treadle, compresses the spring sufficiently to throw the clutch into engagement with the gear. Fastened to the top of the punch and projecting over the clutch ring, is a clutch lever carrying at the end a small roller, the function of the lever being to pull out the clutch, and to hold same clear of the gear

When pressure is put on the foot treadle the clutch lever raises automatically, releasing the clutch, and as the punch completes its stroke, the clutch lever drops back and pulls out the clutch A clearance of 1/16 in. to 1/8 in. both front and back when clutch is disengaged makes it easy to turn the shaft by means of hand wheel or capstan. The adjustable clutch ring enables the operator to regulate the point at which the plunger will stop, which may be at any part of its stroke.

FIFTH. PLUNGER. Generally of cast iron, and equipped with a steel pintle, bushed with bronze. We use the pintle in preference to the old fashioned block, because we know there is less friction and consequently less loss of power. At the same time we cut out less metal from the side of the plunger than is necessary in using the sliding block. Our patent safety capstan contains a ratchet and is so made that the shaft can be revolved by hand, only in the direction that the punch runs. Should an operator leave his bar in the capstan when he starts the machine, but little damage, if any, will ensue, as the capstan will revolve on the shaft as soon as the bar encounters resistance.

SIXTH. DIE BLOCKS, DIE HOLDERS, ETC. Die blocks are generally of steel casting, fastened to the die seat with through bolts. We claim peculiar excellence for our architectural die block. This we brought out about seven years ago. It is so designed that channels or beams from the smallest to the largest sizes can be punched either in the flange or web. It is also suitable for punching flanged heads, angles, tees, plates or bars. Punch and die holders are of hardened tool steel. Both are adjustable out and in. All attachments are interchangeable and easily adjusted.

Any one will admit that to get the best results out of a machine operator you must furnish him a machine which is easy to handle, convenient in operation, and strong enough in construction throughout to perform the maximum work for which it is rated, without break downs. We have studied the construction of CLEVELAND machines from this stand point, and believe we more fully meet the requirements of employer and employee than does any other maker of punching machines.

We originated the architectural jaw which is now widely copied by competitors; also the adjustable punch holder and die socket. We were the first to use the steel pintle in place of the sliding block. We have now designed and brought out the solid frame punch and presume it will be copied. Nevertheless, we hope, gentlemen, to always keep well in advance of our competitors, and we pledge ourselves to maintain with your trade the fulfillment of our constant and well established claim that "OUR NAME GUARANTEES QUALITY".

Sincerely yours.
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By Chas. E. Thomas.
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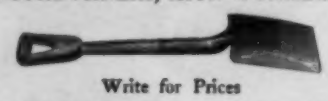

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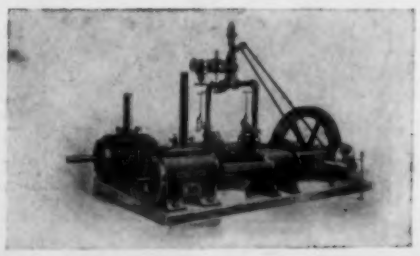

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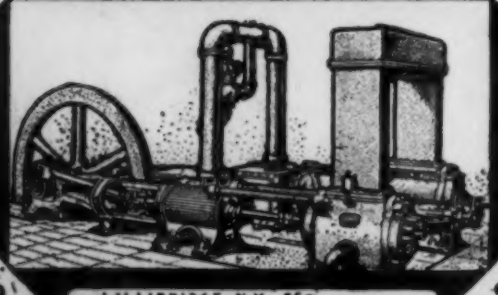

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, MAY 5, 1904 NUMBER 18

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The decision of the merchant producers of Lake Superior ore to maintain no association this year and no agreement as to price or output, while contrary to the expectations encouraged by many recent expressions from high sources, was not surprising to those who have been advised of the sentiment of the merchant firms. This action is not so significant as it would have been two months ago, as in the meantime term contracts involving considerable amounts of ore have been negotiated, leaving not more than 3,000,000 tons that will require to be bought in the open market this year. The prices of 1904 ore, under these new term contracts are somewhat lower than the $3.50 base tentatively referred to in the resolution of the merchant ore men adopted in their separate meeting at New York two weeks ago. Standard Mesabi Bessemers are understood to have gone at about $3. These contracts are on a sliding scale based on the pig iron market. More of them are likely to be made, so that the necessity of an association agreement promises to grow steadily less, though the ore men expect to keep up their organization for statistical purposes. Ore for 1904 is not expected to come down before June 1, but furnaces in most cases are well supplied, many of them for weeks beyond that date. The lake labor situation is threatening, wage advances on a declining market naturally meeting determined resistance.

The rail trade, next to ore, is the most interesting feature of the week. Sales of standard sections for the week include 70,000 tons taken by the Lackawanna Steel Co. and 20,000 tons by the United States Steel Corporation. The New York Central road placed 10,000 tons with each company. The Chicago rail mill of the corporation is kept busy with Western orders and is assured of full operation until late in the year. The Edgar Thomson mill is operated to only about 60 percent of capacity.

When the rail news is written, about all that is favorable in the week's developments has been said. In other finished material lines as well as in pig iron the dullness has been marked. The sentimental effect of the ore association's action will not be helpful, in spite of what may be said as to the lower prices of ore having been discounted in the pig iron market. Foundries in the Central West have been sounded recently as to their probable purchases of iron in May and June. A large majority report that they will not need to enter the market until some time after the middle of the year. There are some signs of furnace companies moving for business in the third quarter, and in Northern iron lower prices are quoted while $9.75 for Southern No. 2 is an available quotation. The prospect of sharper competition between Northern and Southern furnaces in the near future is being commented on, in view of the freight reductions on Southern iron for certain Western points announced last week, and the possibilities of cheap Northern iron with an open market for Lake Superior ores. Bessemer iron is weak and $13 at furnace is now only a nominal price. The Mahoning and Shenango Valley furnaces have little Bessemer iron booked for May and there is only a possibility that the Steel Corporation will need a small amount for steel works that can be more economically served from near-by merchant furnaces than from distant corporation furnaces.

The requirements of cast iron pipe works are the one immediately promising feature of the pig iron market. Some inquiries on this account have been up in the past week. Bids were opened at Cincinnati this week for 18,000 tons of pipe, the beginning of a program of water works extensions there calling for 50,000 tons. New York's new high pressure pipe service will require 80,000 tons and St. Louis extensions will mean 100,000 tons, a portion of both the latter contracts being counted on for this year.

The structural outlook hinges on labor conditions, which are more tranquil in the East. The American Bridge Co. closed 26,000 tons of steel work in April, with 7,000 tons more practically closed, against a total of 20,000 tons in March. Plate business has been fairly active in the Chicago district, but in general unsatisfactory. New business in nearly all finished lines is of small proportions and is vigorously sought after. The real advent of spring has not brought the expected activity.

The official announcement of the purchase of the Clairton Steel Co. by the United States Steel Corporation removes a menace to the billet market. Some cutting of the official prices on billets and sheet bars is still reported, business in the Pittsburg district being affected as well as at Ohio points, as heretofore reported.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 420 PARK BUILDING, May 4.

The local market in both raw and finished lines is inactive, and little new business is being placed. Furnaces and mills, however, continue to operate on orders placed some time ago and the tonnage on the books of the leading producers is sufficiently large to insure steady operations until July 1. Beyond the middle of the year consumers are evincing no interest whatever, and the future is extremely difficult to predict. The small amount of current business is mostly for prompt shipment, indicating that consumers have no stocks and are only buying to cover orders already in hand. Northern iron is weak and there is little buying, and with lower prices for ore still lower prices may be seen in the near future. While it is stated in many quarters that the reduction in ore prices has already been discounted, practically none of the furnace operators have figured on the new schedule on their cost sheets thus far this year. With the new figures as a basis and the loss written off on all ore on hand from last season's shipments, lower prices than those prevailing may be made. Merchant furnaces in the Valleys that operated on Bessemer iron for the steel corporation during the last two months have only a small tonnage on their books for this month's delivery. A small tonnage of Bessemer may be purchased by the steel corporation for May delivery for Cleveland and Lorain, but beyond this no iron will be taken from outside furnaces. Bessemer iron, as noted last week, is held at $13 Valley furnace, and a desirable order could probably be placed at somewhat lower prices. Foundry iron is quoted at $13.60 to $13.85, Pittsburg, and buying is limited almost entirely to small lots for early delivery.

Concessions in the billet market which have been confined to the Cleveland district during the past few weeks are now being made for delivery in this district, agreed prices being shaded from 50 to 75 cents a ton. An inquiry for 2,000 tons of billets for May delivery has resulted in bringing out numerous offers below association quotations, practically all of the smaller mills making concessions to secure the business. Despite this cutting an open market is not anticipated, as the leading outside interest from which low prices emanated in the past has been brought under steel corporation control. Because of the absence of buying on the part of the railroads, the leading rail mills of the country are now operating at only about 60 percent of their capacity. Plate mill capacity is

also curtailed, while on structural shapes more mills are engaged than for some months.

The deal for the purchase of the Clairton Steel Co. was finally closed by the United States Steel Corporation last week at a price which makes this property the best purchase which the corporation has made since its organization. On the other hand the Crucible Steel Co. of America is reported to have lost close to $4,000,000 in the operation, but the statements of the purchase are not sufficiently clear to prove this loss. The ten-year contract entered into by which the Crucible Steel Co. is assured its supply of pig iron and steel assures the steel corporation another outlet for its products, while its billet and pig iron producing capacity is further increased by three blast furnaces and 12 open-hearth furnaces. A surplus of billet producing capacity in the Monongahela Valley makes the erection of additional finishing mills at these plants imperative, and this will probably be done in the future at both Clairton and Donora.

Labor difficulties are not disturbing the building trades in this district at the present time and no troubles are anticipated for the immediate future. With the improvement in the weather conditions an unusually active season for the building trades is assured, and much work held over from last year on account of labor troubles will be completed.

Pig Iron.—The market continues inactive and lower prices are being quoted. Bessemer iron is nominally $13 at the furnace, but this price could be shaded on a desirable tonnage. Foundry No. 2 has been quoted at $13.60 to $13.85 Pittsburg, these lower prices being due almost entirely to the offerings of foundry iron on the part of furnaces that have been producing steel-making irons in the past two months. With few exceptions the Valley furnaces have little tonnage on their books for May and June delivery, and unless there is a great improvement this month furnaces will be banked and blown out in June. Southern sellers are out of this market entirely, as they are unable to meet the low prices that are being named by Northern furnaces. This week the Pittsburg Stock Exchange decided to list pig iron warrants and they will be traded in as soon as the rules to govern the transactions are adopted. The additional furnace capacity which the steel corporation secures by the purchase of the Clairton properties will not help out materially where the pig iron shortage was most acute during the past two months, namely New Castle, Youngstown, Cleveland and Lorain. The pig iron production in this district has been ample in the past, and it is probable that the surplus production from Clairton will be shipped to the Valleys. We revise quotations as follows:

Bessemer, Valley	$13 00
Bessemer, Pittsburg	13 85
No. 1 Foundry	14 15 to 14 35
No. 2 Foundry	13 60 to 13 85
Gray forge, Pittsburg	13 00 to 13 25
Chilled basic, Valley	13 00
Chilled basic, Pittsburg	13 85

Steel.—Concessions on billets are now being made in this district and from 50 to 75 cents a ton better than agreed quotations can be done on both Bessemer and open-hearth. None of the large steel interests are reported shading prices, but the smaller concerns not parties to the agreement are quoting so as to take the small amount of business that is being offered. Agreed prices are as follows: Bessemer and open-hearth billets, 4 x 4 inches, and slabs, up to and including 0.25 carbon, $23 Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Irontown, O., and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance; and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheet and tin bars are $1 per ton extra. Bessemer and open-hearth rods are still quoted at $30 to $31 Pittsburg.

Ferro-Manganese.—Domestic ferro, 80 percent, is held at $42 to $42.50 in small lots delivered at buyer's mill at any point east of the Mississippi, while carload lots and over can be had at slightly lower prices.

Muck Bar.—The market continues quiet and quotations are merely nominal. Neutral iron is quoted at $26 Pittsburg.

Skelp.—There is practically no buying, consumers being pretty well covered until July 1. We quote steel grooved at 1.35c to 1.40c, and sheared at 1.45c; grooved iron at 1.50c and sheared at 1.55c.

Rails and Track Material.—Rail mills are operating only about 60 percent of their capacity and unless the railroads buy more heavily than they have so far this year the output will not be increased. Light rails are weak and are now at $22.50 to $23 for all sections. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; 16 to 40 pounds, $22.50 to $23. Track material: Spikes, 1.65c to 1.70c.

Plates.—The market continues quiet with output considerably curtailed. Some business is coming from the steel car plants, but it is far below normal. Current business is also very light. We quote: Tank plates, ¼ inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.85c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Bars.—While new business continues light, specifications on contracts are heavy and the mills are operating in full. There is practically no demand for bar iron and the weakness in other markets is not reflected here for this reason. We quote as follows: Bar iron, 1.40c to 1.45c Pittsburg, for local delivery, while for Western shipment quotations are based on 1.35c Pittsburg. Hoops are held at 1.40c base, and bands at 1.35c taking bar extras. Bessemer steel bars, 1.35c; open-hearth, 1.40c; plow beams and cultivator beams, 1.35c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.45c. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance.

Structural Material.—The outlook for considerable buying in the near future is bright and more mills are operating on this material at present than for several months. We make the following quotations: Beams and channels, 3 to 15 inches, 1.60; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—Competition in sheets continues keen and 2.20c is the basis for black sheets, No. 28 gauge, in carload lots and over, while smaller lots are sold at 2.25c. Galvanized sheets are also held at lower prices. We revise quotations: No. 8, 1.75c to 1.80c; No. 9, 1.80c to 1.85c; Nos. 12-14, 1.90c; Nos. 15-17, 1.95c; Nos. 18-21, 2c; Nos. 22-24, 2.05c; Nos. 25-26c, 2.10c; No. 27, 2.15c; No. 28, 2.20c to 2.25c; No. 29, 2.50c to 2.55c; No. 30, 2.60c to 2.65c. Galvanized: Nos. 12-17, 2.35c; Nos. 18-21, 2.50c; Nos. 22-24, 2.65c; Nos. 25-26, 2.85c; No. 27, 3c; No. 28, 3.20c; No. 29, 3.60c; No. 30, 4c.

Pipes and Tubes.—Demand for merchant pipe is improving again, while the orders for line pipe continue very heavy. Discounts to consumers, carload lots f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch	68	58	66	56
½ inch	71	61	69	59
¾ to 6 inch	75	65	73	63
7 to 12 inch	71	61	68	58
Ex. Stg., plain ends, ⅛ to 8 in.	67	57	64	54
Double Ex. Stg., pl. ends, ⅛ to 8 in.	59	49	56	46

BOILER TUBES.

	Steel.	Iron
1 to 1½ inch	42½	29
1¾ to 2¼ inch	55½	38
2½ inch	58	41
2¾ to 3 inch	64½	50½
6 to 12 inch	55½	38

Wire and Wire Nails.—The market continues unchanged. Current demand is not heavy, but specifications on contracts continue heavy and there is a pressure on the mills for shipments. We make the following quotations: Wire nails, carload lots to jobbers, f. o. b. cars Pittsburg, are quoted $1.90 base; plain wire, carload lots, $1.80 base; barb wire, carload lots, $2.20 base; staples, carload lots, $2.05 keg. Galvanized, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut

nails, carload lots, $1.75, and less than carload lots, $1.80 f. o. b. Pittsburg, plus freight to points of destination. Terms, 60 days, less 2 percent off in 10 days.

Old Material.—The demand for old material is very light, and the market is inclined towards lower prices. Heavy melting stock is held at $12.50 to $12.75, with practically no buying, while cast scrap is held at $11. No. 1 wrought is quoted at $13.75 to $14. All these quotations are based on gross tons.

Merchant Steel.—As in other lines current demand is light, but most of the mills have a fair percentage of their capacity in operation. Prices remain unchanged as follows: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.65c; plow steel, 6 inches and under, 1.40c for Bessemer and 1.45c for open-hearth; plow slabs, ¼ inch and heavier, 1.65c. The demand for shafting on the part of the machinery manufacturers is not heavy, and tonnage has therefore been considerably affected. Drawn, ground and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carloads.

Coke.—Offerings of coke are heavy and lower prices are prevailing. Furnace coke is held at $1.50 to $1.55, while special brands command as high as $1.65, while the minimum on foundry is $2 and as high as $2.25 is being paid. Coke production is increasing, the output of the upper Connellsville region being estimated at 210,385 tons during the week ending Saturday, April 23, while the output of the lower region during this period was 55,538 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*.
1115 MONADNOCK BLOCK, May 3

An improved demand for plates and rails is the one feature in an otherwise extremely quiet market. Not for some time has the demand for iron and steel products been so light as in the past week. Practically the entire range of products has felt the dullness into which the trade has fallen, and the market has every appearance of having entered into another of those intervals of inactivity which have marked the present year. Prices, generally speaking, are firm. In spots there is some cutting, but not enough to affect established schedules. Sheets, boiler tubes and plates have suffered most in this respect, the cutting being done by several independent producers who are reported short of business in certain gauges and sizes.

New business in heavy rails approximates about 12,000 tons, and is all for delivery in June, July and August, being equally divided between steam and electrical roads. The tonnage in plates is made up of scattered orders, in the aggregate of good proportions, though individually of small lots. It is sufficient, however, to assure the continued operation of the local plate mill for several weeks.

Pig iron and coke have shared in the dullness felt by finished materials. Both melters and producers are pretty well covered for the next few months and neither side is endeavoring to stir up things. Prices are fairly firm, considering the discouraging features of the situation, and though a nice order would undoubtedly test the market severely, the quotations given below are the asking prices on ordinary sized lots. Old material is weak, and aside from the trading between producers and dealers, the market is without interest.

Pig Iron.—Not for some time has trading been at such low ebb and buying in the local market seems to have passed into "innocuous desuetude." Whether melters are waiting to see if the contemplated change in ore prices will bring any lower quotations in pig iron, or whether the present condition is but the commencement of another period of inactivity, time will tell. It was expected that with the advent of warm weather, a marked stimulus would be noted in the movement for iron, but though the warm weather is here the results have been disappointing. Carload orders have been the rule in the past week, occasionally running up to 100 and 200 tons. The total tonnage booked by all the local furnace interests, however, does not aggregate what would be considered a good week's business for any one concern under normal conditions. Prices are fairly firm, and on such lots as are inquired for there is no disposition to shade either the Northern or Southern schedules. It is intimated that a good sized order would bring out better prices than either $13.65 or $14, which are the local quotations on Southern and Northern No. 2 foundry, respectively, but it is a fact that producers have always been willing to take into consideration such details as tonnage, deliveries and credit in the consideration of a lower price on an order of more than usual proportions. Most of the furnaces report that that they are well covered with orders and that specifications are coming in freely. Our quotations follow:

Lake Superior Charcoal	$15 00 to 15 50
Northern Coke Foundry No. 1	14 50 to 14 75
Northern Coke Foundry No. 2	14 00 to 14 25
Northern Coke Foundry No. 3	13 50 to 13 75
Northern Scotch Foundry No. 1	14 50 to 14 75
Ohio Strong Softeners No. 1	15 30 to 15 80
Ohio Strong Softeners No. 2	14 80 to 15 30
Southern Coke Foundry No. 1	14 15
Southern Coke Foundry No. 2	13 65
Southern Coke Foundry No. 3	13 15
Southern Coke Foundry No. 4	12 65
Southern No. 1 Soft	14 15
Southern No. 2 Soft	13 65
Southern Gray Forge	12 40 to 12 90
Southern Mottled	12 15 to 12 65
Southern Silveries (4% to 6% Silicon)	14 85 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 30
Alabama and Georgia Car Wheel	18 85 to 19 35
Malleable Bessemer	14 00 to 14 50
Alabama Basic	13 65 to 13 90
Virginia Basic	14 25 to 14 60

Billets.—There has been some demand for both re-rolling and forging billets in lots ranging downwards from 100 tons to carloads. Association prices are upheld in this market. We quote Bessemer and open-hearth billets, 4 x 4 and larger, up to .25 carbon, $24; up to and including .60 carbon, $1 extra; over .60 carbon, $2 extra. Axle and forging billets, smaller than 4 x 4 $25 Chicago. Open-hearth billets from store, $1.30 per 100 lb.

Iron and Steel Bars.—Iron bars appear to be firmly established on the basis of 1.45c Chicago. There has been little new demand for either iron or steel bars during the week, though specifications on old contracts continue to come in freely. We quote, carload lots, mill shipments, Chicago delivery: Bar iron, 1.45c, full extras; soft steel bars, 1.51½c half extras; with 5c to 10c per 100 pounds extra for less than a carload lot and with the regular extras for less than a ton of a size; angles, less than 3 x 3, 1.56½c base, half extras; hoops, 1.56½c full extras. On lots from store, we quote iron, 1.65c; steel, 1.70c base, half extras; hoops, 2c full extras.

Sheets.—The week has been marked by no noteworthy demand. Orders are of a scattering nature and of small tonnages. There is still considerable competition between the leading producer and independent interests, and some attractive prices have been made to land pending business. The quotations given below are those nominally asked by all the producers, though they can be shaded from $1 to $2 a ton, according to the size of the order. On mill shipments, Chicago delivery, for one pass, cold rolled black sheets, we quote: Nos. 16 and 17, 2.16½c; Nos. 18 and 21, 2.21½c; Nos. 22 and 24, 2.26½c; Nos. 25 and 26, 2.31½c; No. 27, 2.36½c; No. 28, 2.46½c; No. 29, 2.76½c; No. 30, 2.86½c. Galvanized sheets, carload lots, mill shipment, Chicago delivery: Nos. 16 and 17, 2.56½c; No. 18 and 21, 2.71½c; Nos. 22 and 24, 2.86½c; Nos. 25 and 26, 3.06½c; No. 27, 3.26½c; No. 28, 3.46½c; No. 29, 3.86½c; No. 30, 4.26½c. On small lots from store, we quote black sheets as follows: Nos. 8 and 10, 2.15c to 2.20c; No. 12, 2.20c to 2.25c; No. 14, 2.30c to 2.35c; No. 16, 2.40c to 2.45c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.65c to 2.70c; No. 27, 2.75c to 2.80c; No. 28, 2.80c to 2.85c; No. 29, 2.95c to 3c; No. 30, 3.10c to 3.25c. Galvanized, 75 and 7½ percent on gauges 16 and heavier and 75 and 10 percent on gauges 18 and higher.

Structural Steel.—Demand has been of small proportions. Prices are held firm, and we quote carload lots, mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 2c; 18, 20 and 24-inch, 10c extra; tees, 2.05c rates.

Plates.—A much larger tonnage has been taken from the Western trade by the local interest in the past week than it has received in any one week for some time past, and it is now assured of continued operation for two or three months. Independent interests are reported to be still offering prices lower than the association schedules, and have taken a fair

amount of business at such figures. We continue to quote association prices on carload lots, mill shipments, Chicago delivery: Tank steel, ¼-inch and heavier, 1.76½c; flange steel, 1.86½c; marine, 1.96½c; universal mill plate, 1.76½c to 1.81½c; 3-16 inch tank, 1.86½c; Nos. 7 and 8, 1.91½c; No. 9, 2.01½c; No. 10, 1.91½c; No. 11, 1.96½c; No. 12, 2.01½c. From store, we quote tank steel, ¼ inch and heavier, 2c; 3-16, 2.15c; No. 8, 2.20c; No. 10, 2.25c; flange steel, 2.25c to 2.35c, all f. o. b. warehouse.

Rails and Track Supplies.—Orders have been received by the local mill for about 12,000 tons of heavy sections, for deliveries in June, July and August. Light rails are very quiet, and track supplies have also fallen off to some extent. Prices are unchanged, and we quote heavy rails, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $24 to $28, with regular differentials for intermediate sizes. The following quotations on track supplies, which are f. o. b. Joliet mill, may be shaded on large orders. Angle bars, 1.40c to 1.50c; spikes, first quality, 1.70c to 1.80c (out of store, 1.90c rates); track bolts, 3½ x ¾, with square nuts, 2.40c to 2.50c per 100 pounds; with hexagon nuts, 2.55c to 2.65c, with usual differentials for other sizes.

Merchant Steel.—Trade with the implement interests keeps up remarkably well, and further contracts have been made in the past week covering requirements running into next year. Specifications are in good volume and prices are well sustained. We quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 2c; sleigh shoe, flat sizes, 1.56½c; concave and convex, 1.76½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.76½c base; smooth finished tire, 1.71½c; plow steel, 2.30c and upward, according to quality; toe calk, 2.06½c base. Ordinary grades of crucible tool steel, 6½c to 8c; special tool steel, 12c and up. Cold rolled shafting, 52 percent from list in carload lots, and 47 percent discount in less than car lots.

Cast Iron Pipe.—Some new business has come up during the week, but the tonnage is not worthy of special comment. Prices are firm, and we quote carload lots, mill shipments, Chicago delivery: 4-inch water pipe, $26; 6-inch to 12-inch, $25; larger sizes, $24; gas pipe, $1 a ton higher.

Merchant Pipe.—A better movement is noted in the specifications for this product, the tonnage of the week past being much larger than that of the previous week. Prices are without change, and we quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guar. Wrought Iron. Black. Percent.	Guar. Wrought Iron. Galv. Percent.
⅛ to ¾ inch	66.35	56.35	64.35	54.35
½ inch	69.35	59.35	67.35	57.35
¾ to 6 inches	73.35	63.35	71.35	61.35
7 to 12 inches	69.35	59.35	66.35	56.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—Trade with boilermakers continues to improve, and though independent interests are still reported to be offering more attractive prices than the schedule given below, the market may be said to be firmer than it was a few weeks ago. We quote on carload lots, mill shipments, as follows:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	43.35	40.35	53.35
1¾ to 2¼ inch	55.35	38.35	40.35
2½ inch	58.35	43.35	40.35
2¾ inch to 5 inch	64.35	50.35	Up to 4 inches.
6 to 12 inch	55.35	38.35	48.35

For car lots or less direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	40	35	37.50
1¾ to 2½ inch	50	32.50	35
2¾ to 5 inch	60	45	Up to 4 inches.
6 to 12 inch	50	32.50	45

Wire Products.—The unseasonable weather of the last few weeks has seriously affected the consumption of wire products in the agricultural districts of the West and Southwest. New business has been slow, although mills are kept busy filling the specifications on old contracts. The manufacturing trades are reported to be taking their raw material very freely. Prices are unchanged, and we quote to jobbers, carload lots, as follows: Wire nails, carload lots, $2.10; less than carload lots, $2.15; cut nails, carload lots, 1.91½c base; less than carload lots, 1.96½c; smooth wire, carloads, $2, and $2.05 for less than carload lots; galvanized smooth wire, $2.30 in carloads, and $2.35 in lesser amounts; painted barbed wire, $2.40 carloads, and $2.45 in less than carload lots; galvanized barbed wire, $2.70 carloads, and $2.75 less than carload lots. Staples, polished, carloads, $2.25; less than carload lots, $2.30; galvanized, $2.55 carloads and $2.60 less than carload lots. Bale ties, 82½ and 5 percent discount, f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or De Kalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—There is still considerable coke on track in this city and some very attractive prices are being made by dealers to escape payment of car demurrage. This feature of the local situation has demoralized the market, buyers being able to get all the coke they need at almost their own price. Standard 72-hour Connellsville has been offered as low as $4.50 Chicago, and Virginia and West Virginia grades at from $1 to $4.25. On contracts for future deliveries, however, Connellsville coke is held at $2 to $2.25 at the ovens.

Old Material.—The market has been quiet during the week. Consumers are buying only occasional lots where bargains are offered by dealers anxious to dispose of their holdings. While prices are nominally unchanged, they are weak and susceptible to any bearish movement. We quote dealers' selling prices, gross tons, as follows:

Old iron rails	$16 50 to 17 00
Old steel rails (mixed lengths)	11 25 to 11 75
Old steel rails (long lengths)	13 00 to 13 50
Relaying rails	23 00 to 24 00
Old wheels	13 50 to 14 00
Heavy melting steel	10 75 to 11 25
Mixed country steel	9 00 to 9 50

The following are selling prices for net tons:

Low phosphorus scrap (.04 and under)	$13 00 to 14 00
No. 1 R. R. wrought	12 50 to 13 00
No. 2 R. R. wrought	11 50 to 12 00
Shafting	13 50 to 14 00
Dealers' forge No. 1	9 25 to 9 75
No. 1 cast	11 50 to 12 00
No. 1 busheling and wrought pipe	9 00 to 9 50
Heavy cast (300 pounds and over)	8 50 to 9 25
Agricultural malleable	9 00 to 9 50
Iron axles	16 50 to 17 00
Steel axles	14 50 to 15 00
No. 1 boilers, cut	8 50 to 9 00
Cast borings	4 50 to 5 00
Mixed borings, etc	4 50 to 5 00
Wrought turnings	7 25 to 7 75
Machine shop turnings	7 25 to 7 75
Iron axle turnings	8 25 to 8 75
Steel axle turnings	8 25 to 8 75
Stove plate and light cast scrap	9 00 to 9 50
Old iron splice bars	13 50 to 14 00

The National Tube Co. has removed its offices from the Western Union Building to the eleventh floor of The Rookery, the building in which the other constituent companies of the United States Steel Corporation are located.

CLEVELAND.

OFFICE OF *The Iron Trade Review*, 1064 ROSE BUILDING, May 3.

The market continues to be very quiet and the tendency of prices, except those controlled by agreements which in previous periods of dullness have stood the tests, is downward. There is, however, little reason for taking a gloomy view of the outlook, for consumption is large, mills are fairly busy and labor leaders are more disposed to be reasonable.

Iron Ore.—The meeting of merchant firms mining and selling Lake Superior iron ores, held on Tuesday, resulted in an adjournment *sine die* and without any agreement. It did not take long for those who attended to come to the conclusion that certain pre-requisites of an agreement on prices and output in 1904 could not be complied with, and for the first time in ten years the producers of Lake Superior ores enter the selling season without any agreement as to prices.

The conditions leading to such an outcome have been discussed at some length in these columns in the weeks of negotiation since the first meeting of ore men was held in Cleveland in the second week of February, or nearly three months ago. The New York meeting of two weeks ago developed no change in the attitude of the United States Steel Corporation, which insisted that if it kept out of the market as a seller of ore, either directly or by conversion deals, it should not be restricted in the amount of ore it mined and brought down for its own use. Other producing consuming interests took the same position. The contention of the mer-

chant ore firms was that they should not be called upon to bear the brunt of the unfavorable conditions of 1904; that while they were restricting output to keep the market from demoralization, the other interests to whom the sustaining of the market meant much should enter into any arrangement that might be made, on equal terms with the merchant companies, namely, as miners of ore. The outcome of the New York meeting was an expression from the merchant companies that in case the consuming producers did not join in a movement to limit output no higher base prices could be maintained than $3.50 for old-range Bessemer, $3.25 for Mesabi Bessemer, $2.85 for old-range non-Bessemer and $2.65 for Mesabi non-Bessemer. The merchant ore firms then agreed to meet in Cleveland and consider whether on this basis they could maintain an association. Yesterday's decision was that they could not.

There will still be the organization of ore men for statistical purposes that has been in existence for nine years, but no concert of action on prices or production. While the failure to agree was to some extent expected, ore sellers and buyers are now much at sea. As a rule furnaces are supplied with ore for two or three months to come, and in some cases ores on hand will last longer, so that there is no hurry, and only here and there will some component of a mixture be required by June 1, when the first ore of the year will probably be put on Lake Erie docks if lake labor questions can be settled. The absence of an association agreement in 1904 is not so significant as appears in the statement that after nine years of working under agreements the ore men have gone their several ways. All the merchant concerns have been busy in the past two months negotiating term contracts, and the amount of ore likely to be bought in the market under contracts applying to this season only is probably not more than 3,000,000 tons. Central and Eastern Pennsylvania furnaces and some interests in Western Pennsylvania and Eastern Ohio have taken ore under the recently negotiated term contracts, which in all cases are on a sliding scale based on the pig iron market. The tonnage is quite considerable and the prices for 1904 are somewhat below those named in the New York resolution referred to above.

The association of Lake Superior ore producers and sellers dates back to 1895, when the producers of old-range Bessemers came together on an agreed price and a tonnage allotment. The Mesabi producers were not in the original agreement, but in some of the nine years have been included. Non-Bessemer ores were not included in the early years of the association, but have been in the last three or four years. The Bessemer base price has been that of a supposititious ore containing 63 percent of iron, 0.045 percent phosphorus and 10 percent moisture. The price of this ore has been as follows: 1895, $2.90; 1896, $4; 1897, $2.65; 1898, $2.75; 1899, $2.95; 1900, $5.50; 1901, $4.25; 1902, $4.25; 1903, $4.50. The association has been conducted in an eminently conservative way, as a rule, and with broad-minded administration. The price made in 1896 was generally believed to have been a mistake, and there was considerable question about the price of 1900, another presidential year. But the aim has been to follow the pig iron market and by treating all buyers alike give the furnaceman a stable foundation on which to operate. Since the association was organized great changes have come over the ore business. Many consumers of ore have become mine owners and now produce all their requirements. Others have interests in mines that furnish a considerable part of the ore they need, and still others have contracts running five years or ten years, by which they get their ores on a sliding scale, or in some cases at a low flat price. The need of an association, apart from statistical purposes, is not likely again to be what it has been previous to this year.

Lake labor problems are still receiving attention. The executive committee of the Lake Carriers' association has been holding conferences with delegates from the unions of seamen and firemen and will meet Thursday with the representatives of the masters. An agreement has been made with the firemen providing for a slight reduction in wages. It is expected that the wages of seamen will be decided upon this week and that within a few days an agreement with the captains will be signed. The latter are apparently willing to give up their contention in regard to the right of vesselmen to discharge, provided there is an understanding as to what officials of the large companies shall have power to discharge. The shipments of ore from Lake Superior ports for April, 1903, were 980,325 tons, and for April, 1902, they were 1,855,002 tons. There is no prospect of any ore being shipped before May 15, and delay in settling labor questions may postpone the opening of navigation until a still later date. Last year on May 1, deducting new ore brought down in April, the stocks of ore at Lake Erie ports were 3,592,367 tons. That amount will be exceeded this year, but the statistics have not yet been compiled.

Pig Iron.—The quotation $12.50 Valley, for No. 2 foundry, heard of occasionally last week, has now become the ruling price, but the reduction has not encouraged buyers to place orders and the market is extremely dull. The recent reduction of freight rates from Birmingham to Chicago and other northern cities does not apply to Cleveland. The principal Southern producers are asking $10 Birmingham, or $13.85 for No. 2, but are making no sales, as they cannot compete with Northern irons. In Cleveland, local furnaces are asking from $13 to $13.25 at the furnace for No. 2. The charcoal iron situation is not satisfactory to sellers, as prices are sagging and demand is very limited. We quote as follows for Cleveland delivery save on Northern gray forge, which is at Valley furnace:

Bessemer	$13 85 to 14 00
No. 1 Strong Foundry	13 85 to 14 00
No. 2 Strong Foundry	13 25 to 13 50
No. 3 Foundry	12 40 to 12 75
No. 2 Southern	13 60 to 13 85
Gray Forge, Valley furnace	12 40 to 12 75
Gray Forge, Southern	13 00 to 13 10
Lake Superior charcoal	14 35 to 14 50

Finished Material.—The present week has been the dullest for a long time. Mills are fairly busy on steel bars sold before the advance to 1.44½c Cleveland, or 1.35c Pittsburg, but new orders are scant and very little bar iron is being sold at 1.44½c Cleveland. The reduction in the price of scrap will probably be followed by lower prices for bar iron. Several traction companies have financed their proposed lines and are in the market for about 10,000 tons of rails. Steam railroads are still refraining from placing orders except for absolutely necessary supplies. There is no change in the sheet situation. Prices of the principal producer through jobbers are as follows: Mill sales of black sheets, No. 10, 1.75c; No. 11-12, 1.80c; No. 14, 1.85c; No. 16, 1.95c; No. 27, 2.20c; No. 28, 2.30c. Galvanized, 80, and 3 off. Out of stock prices are as follows: No. 10, 2.10c; No. 12, 2.15c; No. 14, 2.20c; No. 16, 2.30c; No. 18-20, 2.40c; No. 24, 2.45c; No. 25-26, 2.50c; No. 27, 2.55c; No. 28, 2.65c; No. 30, 3.10c. Galvanized out of stock, 75, 10 and 5 off

Old Material.—The market is weak and dull. Prices in nearly all kinds of scrap are lower. We quote as follows for gross tons Cleveland:

Old iron rails	$18 00 to 19 00
Old steel rails (over 6 feet)	13 00 to 14 00
Old steel rails (6 feet and under)	13 00 to 13 50
Old car wheels	12 00 to 13 00
Steel boiler plates	10 00 to 11 00
Malleable iron (railroad)	11 50 to 12 00
Malleable iron (agricultural)	10 00 to 10 50
Heavy steel	11 00 to 12 00

We quote the following net tons:

No. 1 R. R. Wrought	$13 00 to 13 50
No. 1 busheling	11 00 to 11 50
No. 1 machine cast scrap	11 50 to 12 00
Iron axles	16 50 to 17 50
Axle turnings	8 00 to 9 00
Wrought turnings (free from cast)	7 00 to 7 50
Uncut wrought iron boilers	5 00 to 6 00
Grate Bars	8 00 to 9 00
Pipes and flues (clean)	10 00 to 10 50
Tank iron	9 50 to 10 50
Hoop and band iron	5 00 to 6 00
Sheet iron	4 00 to 5 00
Wrought drillings	7 00 to 7 50
Stove Plate	8 00 to 8 50
Steel axles	14 00 to 15 00
Cast borings	5 00 to 5 50

CINCINNATI.

May 3.

The coke market remains dull and lifeless with an easy tone prevailing. The best brands are still held at $2.25 Connellsville, but there are some makes offered as low as $1.75 Connellsville. For the most part $2 seems to be about the ruling figure, but there is considerable irregularity in the

quotations. There is a light demand and but little business is being done at any price.

Pig Iron.—The demand this week has been the lightest for some time. The market has also taken a turn toward weakness and while a week ago quotations at $9.75 Birmingham for No. 2 foundry were rather difficult to locate with certainty, because of the cautious way such prices were put out, and also of the infrequency with which the cut price was quoted, it is now almost an open figure and has been done on several sales, and one furnace interest is credited with having invited business at the $9.75 Birmingham basis freely throughout this territory in correspondence. The feeling in the trade is lacking in confidence, with prices irregular and orders so few there is not much that is encouraging in the outlook. Another investigation has been made by a pig iron selling agency to ascertain the probable requirements of melters of foundry iron in this territory between now and July 1, with the result that only 31 out of a large number of replies received say they will need iron during May and June, and a majority say that they have enough bought to carry them into the second half of the year, as they have not melted up to their expectations. Traveling men report melters using very little iron and cutting down their daily output in some lines. The only large inquiry in the market comes from the pipe makers, in addition to two lots of 3,000 tons each, to be bought on analysis. The impression prevails that the letting of the pipe contract for the new city water works here this week will bring about large orders for Southern iron. While prices are being obtained from the Ohio furnaces as well as the Southern makers it is the general impression that Southern iron will be used, at least on the bulk of the order. The buying is expected to amount to about 20,000 to 25,000 tons of pig iron. In Northern irons while the tone of the market is reported as easy there is no quotable change. Current prices f. o. b. Cincinnati are:

Southern Foundry No. 1	$13 00 to 13 50
Southern Foundry No. 2	12 50 to 12 75
Southern Foundry No. 3	12 00 to 12 25
Southern Foundry No. 4	11 75 to 12 00
Southern Foundry No. 1 soft	13 00 to 13 50
Southern Foundry No. 2 soft	12 50 to 13 00
Gray Forge	11 50 to 11 75
Northern Foundry No. 1	14 15 to 14 65
Northern Foundry No. 2	13 65 to 14 15
Northern Silvery (8% silicon)	16 15 to 16 65
Southern car wheel iron	16 75 to 17 00

Finished Material.—The week for the most part has been rather quiet and the market remains unchanged. Some jobbers have had some better orders in the first few days of May than for some time, and there is a feeling that as soon as the weather opens up business will show improvement. Bar iron is quoted at 1.45c f. o. b. Steel bars, 1.48c base, half extras, with dealers quoting 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 to 75, 5 and 2½ percent off. We quote black sheets, No. 27, at 2.45c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.80c; No. 27, 2.70c; No. 16, 2.45c; No. 14, 2.35c; No. 12, 2.30c; No. 10, 2.25c. Tank plates are dull and sell out of store at 2c for ¼-inch and 2.10c for 3-16 inch. Beams and channels are quoted at 1.90c to 2c from stock and angles at 1.90 to 2c for base sizes.

Merchant Pipe.—There are no price changes and the trade is about the same as last week. There was some improvement in the amount of inquiry coming in, but on the whole trade is quiet. We quote for car lots f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	64.7	54.7
½ inch	69.7	59.7	67.7	57.7
¾ to 6 inch, inclusive	73.7	63.7	71.7	61.7
7 to 12 inch, inclusive	69.7	59.7	66.7	56.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1¼ inch	41.2	27.7
1¼ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—There is no change in the situation and the market is quiet with buyers and sellers both disposed to wait developments. We quote:

Old No. 1 railroad wrought, net tons	$11 50 to 12 00
Cast machine and foundry, net tons	11 00 to 11 50
Old iron rails, gross tons	16 00 to 16 50
Old steel rails, gross tons	12 50 to 13 00
Old short lengths, gross tons	11 00 to 12 00
Old iron axles, net tons	15 50 to 16 50
Stove plate, net tons	9 50 to 10 50
Wrought turnings, net tons	7 50 to 8 00
Cast borings, net tons	4 50 to 5 50

PHILADELPHIA.

May 3.

Although consumption is still large, there is very little buying and the outlook has not improved. The demand from large corporations for money which is apparently needed to meet maturing obligations is one of the unfavorable signs of the times. The general tendency is toward lower prices.

Pig Iron.—The market is dull and shows indications of weakness. Demand is not strong enough to test the market, but, so far as prices can be quoted, they show little change. If buyers were to consider placing orders for the third quarter, lower prices would doubtless be named. We quote as follows: No. 1 X foundry, $15.50 to $16; No. 2 X foundry, $15 to $15.25; No. 2 plain, $14.50 to $14.75; Alabama No. 2 rail shipment, $14.25 to $14.50; Alabama, No. 2 on dock, $13.50 to $13.75; Standard gray forge, $13.75 to $14; ordinary gray forge, $13 to $13.25; basic, $14 to $14.10.

Steel.—The demand is not as active and prices are somewhat easier, $25 delivered being the usual quotation.

Finished Material.—Orders are not coming in freely, but there is nothing positively unfavorable and a turn for the better is hoped for. The erection of new buildings is expected to improve the demand for structural material very soon, but the strike today of 5,000 workmen employed in building trades will, if not settled promptly, mar an otherwise favorable prospect in this city. We quote as follows: Beams, channels and angles, 1.73½c to 1.85c, according to specifications, and small angles, 1.50c to 1.55c. Bars, both iron and steel, 1.48½c to 1.55c; skelp, 1.45c to 1.50c, sellers mill for grooved and a tenth more for sheared.

Old Material.—The demand has fallen off and prices are weaker. We quote: Old steel rails, $15 to $15.50; miscellaneous heavy steel, $14 to $15; low phosphorus scrap, $18 to $18.50; old steel axles, $18 to $19; old iron axles, $21.50 to $22; old iron rails, $18 to $18.50; old car wheels, $13.50 to $14; choice railroad No. 1 wrought, $17.50 to $18; country scrap, $16 to $17; machinery cast, $13.50 to $14; No. 2 light scrap (forge), $12.50 to $13; No. 2 light scrap (ordinary), $10.50 to $11; axle turnings, $10.50 to $11; wrought turnings, $9.75 to $10.20; cast borings, $7.50 to $8; stove plate, $12 to $12.50; wrought iron pipe, $13 to $13.50; boiler punchings, $15.50 to $16.50.

NEW YORK.

OFFICE OF *The Iron Trade Review*.
ROOM 1315, NO. 150 NASSAU ST., M y 3

Pig Iron.—Dullness of a pronounced kind was in evidence in the local pig iron market during the past week. Transactions were few and far between, and made up the smallest tonnage that has been placed in any week of the present year. Of inquiries of any consequence one for 1,000 tons of foundry on special analysis from the International Steam Pump Co. is all that can be noted. Other inquiries represent a very small tonnage. Complaints of poor business both from Northern and Southern furnaces are frequent, and the opinion that the third quarter gives many indications of being dull finds many supporters. While $10 still continues to be quoted for Southern No. 2 foundry at Birmingham, sales at this figure are extremely light. That $9.75 has been done is admitted here, but the tonnage in prospect is so small that sales agents say that the question of price is not a controlling one. In Northern irons light sales and fewer inquiries have been the rule. Prices are not as strong as they have been, and a good proposition could be placed at from 25 to 50 cents lower than was possible a month ago. Consumers look upon the market as having a receding tendency, and are providing for their wants very cautiously. The orders for the Pennsylvania tunnel castings are said to be in excellent shape for closing, and a definite announcement looks more like a certainty now than in weeks. Some founders who submitted bids withdrew them during the week rather than run the risk of a loss. Published reports that an agreement as to a base price has

been reached by the three leading Southern interests are premature at the best. Officials of the companies seen asserted nothing could be said in the matter. New York prices on pig iron are as follows: Northern No. 1 X, $15.50 to $15.95; No. 2 X, $14.75 to $15.20; No. 2 plain, $14.50 to $14.95; Southern No. 1 foundry, $14. to $14.25; No. 2 foundry, $13.25 to $13.75; No. 3 foundry, $12.75 to $13.25; No. 4 foundry, $12.25 to $12.75.

Rails.—The long-expected entrance of railroads into the market seems to have materialized during the past week. Sales aggregating at last 90,000 tons have been made. Of this amount the Lackawanna Steel Co. booked 70,000 tons. Eastern roads were the chief buyers, the New York Central taking 10.000 tons. Sales by the United States Steel Corporation during the week aggregated at least 20,000 tons, one order for 10,000 tons from the New York Central being included. The situation at present is regarded as more hopeful. Standard sections are $28 at the mill.

Finished Iron and Steel.—The structural material market for the week has been only fairly active, with small orders predominating. Business in sight includes 1,800 tons for a manufactory in Jersey City. The Erie road's order for 2,000 tons will go to one of the independent interests because of a lower bid. The actual sales for April by the American Bridge Co. aggregate 26,000 tons (against 20,000 tons the previous month), with 7,000 tons more practically closed. Bars are in fair demand, with the outlook not regarded as favorable. Sheets are quiet, with jobbers shading their prices in their anxiety to get orders. Plates are dull, with buyers only providing for their immediate needs . New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.35c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84½c to 1.90c; firebox, ordinary, 1.94½ to 2c; refined iron bars, 1.50c to 1.55c; soft steel bars, 1.50c to 1.55c; steel sheets, in carloads, New York, No. 28 black, 2.45c to 2.50c; galvanized, 3.45c to 3.50c.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315 NO. 150 NASSAU ST., May 3.

Pig Tin.—While from the standpoint of prices, the market is unchanged, an easier feeling permeates it. Current orders continue to be for small lots, and only making a fairly large aggregate. In London the market has been characterized by a slight falling off in prices with the recent bullish tone showing signs of disappearance. Secretary C. Mayer's statistical tables for April, which good judges in the light of prospective trade conditions think mean lower prices, show deliveries into consumption to have been 3,900 tons, which is a decrease of 1,400 tons as compared with the first four months of last year. Arrivals were 1,402 tons, with 4,024 tons afloat. The world's total visible supply at the end of the month was 13,695 tons, against 15,662 tons at the end of March, and 15,978 tons at the end of April, 1903. Closing prices at the Metal Exchange today follow: Spot and May, 27.9c to 28.10c; London's closing today was £127 10s. for spot, and £126 15s. for futures.

Copper.—Prices remain steady, with the opinion strong that they are likely to remain so for several weeks anyway, the policy of the leading interests seeming to be to curtail production. London during the week was firm, and prices showed a tendency to harden. Secretary Mayer's statistics for April show exports to have been 13,554 tons, against 22,625 tons for March, and the total shipments for the first four months 82,577 tons, against 46,024 for a simliar period last year. Closing prices at the Metal Exchange today follow: Lake, 13⅜ to 13⅝c; electrolytic, 13⅛ to 13¼c, and casting, 12⅞ to 13⅛ c. London's closings today follow: Spot, £58 17s 6d; futures, £58 15s.

Lead.—Is unchanged and in fair demand at 4.60c to 4.65c. St. Louis is steady at 4.40c to 4.42½c. London is very weak at £12.

Spelter.—Is firm at 5.20c to 5.25c. St. Louis is weaker at 5.07½c. London is still quoted at £22 7s 6d.

Antimony.—Prices are unchanged, Cookson's being 7¾c to 8c; Hallett's, 7¼c to 7½c, and other grades, 6¼c to 6½c.

Quicksilver.—We quote $45 per flask of 76½ pounds in lots of 100 flasks. London is £8 2s 6d.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, May 3.

Metals have been quiet in the past week. No changes are to be noted in quotations, despite the reports from Eastern markets that copper was gaining strength and might be marked up a few points. Copper is still quoted in this market at 13½c for Lake in carload lots, and 14c to 14½c for smaller lots. Casting, 13¼c for carloads, and 13¾c for smaller lots. Pig tin is firm at 29c to 30c, according to quantity. Spelter is selling freely at 5⅛c for carloads, and 5¼c to 5½c for less than carload lots. Sheet zinc, 5.75c per lb. in carlots of 600-lb. casks, and 5.95c to 6c for less than carload lots. Pig lead, 4.45c, carloads, and 4.50c to 4.55c in lesser amounts. Antimony, 8½c to 8¾c for Cookson's, and 7¼c to 7½c for Hallett's. Nickel, 45c to 60c, according to quantity.

Old metals are probably in a little better demand and offerings are more free than they have been. Prices keep relatively the same, however, and we quote as follows: Copper wire and heavy, 11¼c; copper bottoms, 10½c; copper clips, 11⅛c; red brass, 10¼c; yellow brass (heavy), 8c; yellow brass borings, 6¼c; red brass borings, 8¼c; light brass, 5¾c; pipe lead, 4c; tea lead, 3.90c.

JOSEPH WHARTON ON THE IRON SITUATION.

(Special Telegram.)

PHILADELPHIA, May 4.—Joseph Wharton, president of the American Iron and Steel Association, in speaking of the iron and steel trade in particular, and industrial and financial conditions in general today, took a hopeful view of the situation. He looks for a general improvement in all lines.

"The panicky conditions which pervaded the iron and steel trade last November and December, he said, have disappeared entirely and the improvement in demand and increase in consumption thus far this year have been wonderful. However, I do not look for higher prices this year than are now ruling, for the reason that much buying is curtailed on the eve of the presidential election. In addition, cost of production has been reduced by lower coke, cheaper ores and a lower labor cost, so that the cost of manufacturing iron and steel products is not nearly as great as at this time last year.

"Consumption of iron and steel is tremendous at present, and while I do not anticipate that production this year will be as great as last year's total, I do not look for a very great falling off. The country generally is in a very strong condition financially. There is plenty of money, the West and South being in better condition than ever before. There is no sound reason for the feeling of pessimism shown in some parts of the country today, and after the election I anticipate a great improvement in the iron trade. Next year is going to be a profitable one to iron and steel manufacturers, as much of the work that is now being held up on account of the uncertainties of a presidential year and the general conservatism, will then be carried through."

Southern Billet Shipments from Pittsburg.

(Special Telegram.)

PITTSBURG, May 4.—An order for 6,000 tons of wire billets for an Alabama consumer is being filled by a Pittsburg mill. The association delivered price is $25.25 and the freight is $4.65, making the net price at works $20.60. About one fourth of the order is already shipped.

The Steel Corporation will likely apply shortly to terminate the receivership of the Clairton Steel Co. No difficulty is expected in having this done, whereupon the properties will be formally transferred.

J. B. Adams, who has been general manager of the Northern Wire & Cable Co., South Milwaukee, Wis., is no longer connected with the company.

PERSONAL.

A. H. Beale, formerly superintendent of the open-hearth department of the American Sheet & Tin Plate Co. at Vandergrift, Pa., has become manager of the Eastern Steel Co., Pottsville, Pa.

W. B. Cowles, president of the Long Arm System Co., Cleveland, sailed with his family for a European trip on Saturday, April 30. He will be absent several months bringing his company's specialties to the notice of representatives of foreign navies.

E. E. Eshenshade, superintendent of the finishing mills of the LaBelle Iron Works, Steubenville, O., has resigned and has been succeded by H. K. Williams, of Warren, O. Master Mechanic Henry Hitchfelt, of this plant, has also resigned and has been succeeded by Philip Paster.

William H. Creahan, formerly superintendent of the tube department of the Youngstown Iron, Sheet & Tube Co., of Youngstown, O., has resigned to accept the position of night superintendent of the Soho mill of the National Tube Co., Pittsburg.

For the present no successor will be appointed to Willis McKee, chief engineer of the Republic Iron & Steel Co. at Youngstown, O., who recently resigned.

H. W. White, mechanical engineer of the Enterprise Boiler Co. of Youngstown, O., has resigned. He will interest himself in the manufacture of a waste heat boiler on which he has just secured a patent.

Walter Rhodes, of the firm of Joshua W. Rhodes & Co., Pittsburg, returned this week from a European tour.

John Bott, master mechanic of the Brown-Bonnell plant of the Republic Iron & Steel Co., Youngstown, O., has resigned. His successor has not yet been appointed.

George K. Hosford, Cleveland representative of Rogers, Brown & Co., was stricken with apoplexy on the night of April 26, and has since been very seriously ill, but the improvement of the past few days has been encouraging.

At a meeting of the board of directors of the Virginia Bridge & Iron Co., Roanoke, Va., C. E. Michael was elected president, vice W. E. Robertson, resigned. Mr. Michael has been general manager of the company for several years.

Thomas R. Smith, of Greenville, Pa., has been appointed superintendent of the Warren, O., mill of the Carnegie Steel Co. to succeed Howard Williams, who goes to La Belle Steel Co., Steubenville, O.

Mrs. Hibbs, wife of Jos. S. Hibbs, assistant general manager of J. W. Paxson Co., of Philadelphia, Pa., died on April 1, after a short illness, at St. Joseph's Hospital, Philadelphia. Mrs. Hibbs was well known among foundrymen, having made repeated trips with her husband in the last twelve years, visiting all the leading cities of the country, and also attending meetings of the foundrymen's associations in different localities with him. She was prominent in charitable societies.

Condition of the Rail Mills.

(Special Telegram.)

NEW YORK, May 4.—Owing to lack of rail orders the Edgar Thomson mill of the Carnegie Steel Co. is operating to but 60 percent of its capacity. The preponderance of rail orders in the West permits the South Chicago mill of the Illinois Steel Co., with a smaller capacity than Edgar Thomson to operate in full. As all rails for Western roads taken by the Steel Corporation have been apportioned to Illinois the full operation of that plant is assured until well toward the end of the year. The Ohio plant at Youngstown will not go on rails this year, being kept busy on billets and sheet bars. In the East the rail mill of the Pennsylvania Steel Co. is in the best shape, with its Pennsylvania railroad allotment and foreign orders amounting to 60,000 tons. It will probably operate in full the balance of the year. With the 70,000 tons it has closed in the past week the Lackawanna Steel Co. has a much improved outlook.

The claim has been made for the Allen portable pneumatic riveting machine that it will drive 175 rivets in five minutes, and the performance of one of these machines in a large structural shop in New York City is cited. This type of riveter is equipped with interchangeable levers for girders or channel work. The manufacturer is John F. Allen, 370-372 Gerard avenue, New York.

UNION AND NON-UNION SHEET MILL SCALES.

In the absence of definite information, it has been pretty generally reported in labor circles that the scale of wages paid in the non-union sheet mills of the American Sheet & Tin Plate Co. is considerably lower than the Amalgamated Association sheet scale, but such is evidently not the case. The *National Labor Tribune*, of Pittsburg, gives the scale applicable to the Kiskiminetas Valley, now in force, and it is practically the same as the present union sheet scale. On January 1 a reduction of 20 percent was made in the scale of wages paid in the non-union sheet mills in the above district, and according to these figures, the regular Amalgamated scale was paid in these mills prior to that date. The April reduction of 18 percent made by the Amalgamated Association makes their present scale only slightly higher than that now in force in the non-union mills. The two scales compare as follows:

Gauge.	Non-union scale Price rolling steel Ton 2 240 lbs.	Amalgamated Scale.
No. 8 and heavier	$ 2 88	$ 2 95
Nos. 9 to 11	3 20	3 28
Nos. 12 to 14	3 84	3 94
Nos. 15 to 17	4 44	4 55
Nos. 18 to 21	5 40	5 54
Nos. 22 to 24	7 04	7 22
Nos. 25 to 26	8 00.6	8 30
No. 27	8 80	9 02
No. 28	9 36.8	9 60
No. 29	9 84	10 00
No. 30	10 56	10 82
No. 31	13 68	14 02
No. 32	16 64	17 26
LARGE DOUBLE MILL.		
Per day of 7 heats.		
Pair heating	$ 2 30	$ 2 30
Doubling	2 02	2 01
Matching	2 13	2 12
Roughing	2 99	2 99
Catching	2 99	2 99
Extra helpers, two each	2 02	....
SMALL DOUBLE MILL.		
Pair heating	$ 2 13	$ 2 12
Doubling	1 73	1 72
Matching	1 84	1 84
Roughing	2 59	2 58
Catching	2 59	2 58

Following are the rules in force at the non-union mills:

1. Roller to receive the earnings of the mill, less 25 percent for sheet heating, less 20 percent for shearing and less the wages of rougher and catcher (small mill $5.18, large mill $5.98 per day of 7 heats).

2. Sheet heater to receive 25 percent of the earnings of the mill, less pair heater's wages for helping (small mill 50 cents, large mill $1 per day of 7 heats).

3. Shearman to receive 14 2-7 percent of the earnings of the mill, less the wages of opener (small mill $1.65, large mill $1.85 per day of 8 hours).

4. When sheets are rolled lighter than gauge, the mean between the next higher and lower rolling price will be paid.

5. In case of failure to make full turn due to heavy or wide iron, day men will be compensated for a turn, if full eight hours are worked.

6. Extra help furnished on 36-inch wide and over, or narrower at the discretion of superintendent.

7. For all sheets No. 23 gauge and lighter, 36-inch wide and over, 10 percent additional to above rolling price will be paid.

8. Classification to remain as at present.

Increase in the Wharton Iron Ore Properties.

(Special Telegram.)

PHILADELPHIA, May 4.—Joseph Wharton, of this city, has further increased his iron ore holdings in New Jersey by the purchase of the properties of the New Jersey Iron Mining Co. With these properties the amount of ore now held by the Wharton interests is estimated at 30,000,000 tons and this figure is considered extremely conservative. The indications are that the amount taken out will far exceed this. These ores are well adapted to the manufacture of basic iron, and with the increase in the annual capacity of the Wharton furnaces to 360,000 tons, the easy possibility of a large increase in basic open-hearth steel production in the East is suggested.

A 1,500-K. W. ALTERNATOR FOR ST. LOUIS.

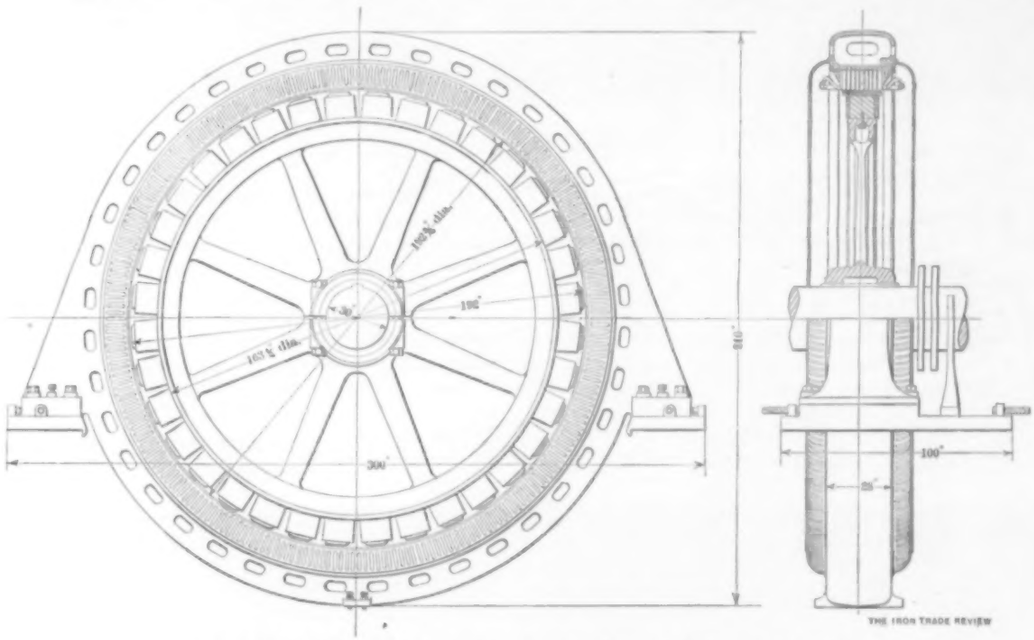
A National alternating current generator will be installed at the Central Power station at the Louisiana Purchase Exposition at St. Louis. It will be direct connected to a 2,250-h. p. Hamilton-Corliss, vertical, cross compound engine. The rated output is 1,500 k. w., 25 cycles, 6,600 volts, running at 83 r. p. m. and the power generated will be used for various purposes. Two views of the machine are presented below. Like all standard alternators built by the National Electric Co., of Milwaukee, Wis., it is of the revolving field type, leaving the armature stationary and easily accessible and the difficulty of properly insulating the armature coils is eliminated, as the windings are not subject to any mechanical strains whatever. The revolving field is of large diameter, giving additional flywheel effect to the engine, and the construction of the field coils renders them practically indestructible. All parts are accessible and the method of ventilation insures low temperatures.

The revolving field is made of cast steel in halves and these are bolted together and then further secured by shrunk on links. The rim of the wheel has a channel cross section to which the cast steel pole pieces are bolted. The field coils comprise 65 turns of 1½ x ⅛ inch copper strip, wound on edge and thoroughly insulated, the outer edge of the coil being exposed to the atmosphere for cooling purposes. Laminated pole shoes are secured to the ends of the pole pieces and serve to hold the field coils in position. These shoes cover a large polar arc and evenly distribute the magnetic flux. The field coils are insulated from the pole pieces by fuller board, and from the pole shoes and spider ring, by heavy fiber. The revolving field is 16 feet in diameter and weighs approximately 50,000 pounds.

The frame is a circular cast iron housing into which laminated punchings, with inwardly projecting teeth, are assembled for the reception of the armature windings. The frame is extremely heavy and stiff, not requiring any external support, and is divided horizontally, the halves being firmly bolted and keyed together. These bolts and keys are contained entirely within the cross section, obviating the use of side lugs. Large open spaces are provided in the sides of the frames, allowing a free passage of air from the ventilating ducts in the core.

The armature core is built up of laminated soft steel, the punchings being annealed and japanned before assembling. Ventilating space blocks are inserted at suitable intervals in the armature core, providing openings extending around the circumference and permitting a free passage for the heat generated in the windings. There are six slots to each pole, 2½ inches deep x 1½ inches wide, every slot being wound with 14 conductors of .37 x .28-inch compressed copper strand. The internal diameter of the armature is 16 feet ¾ inch and the width of the core 16 inches. Cast iron collector rings and carbon brushes are used, enabling the machine to be operated with a minimum amount of attention and at the same time provides a collector gear, which will carry a heavy temporary overload.

The net weight of this alternator is 135,000 pounds and the following are the guarantees the National Electric Co. offers on this machine. Efficiency—1¼ load, 95.5 percent; full load, 95.5; ½ load, 94.75. Regulation—5.5 percent on power factor 1; 22 percent on power factor zero. The temperature will not exceed 30 degrees on armature and magnets on a continuous run at full load, and 40 degrees on the armature and magnets on a continuous run at 25 percent overload. The National Electric Co. is the successor to the Christensen Engineering Co.



NATIONAL ELECTRIC CO'S GENERATOR FOR LOUISANA PURCHASE EXPOSITION.

The Schwartz Foundry Co., New Orleans, has purchased a site and will use it for a manufacturing plant. Further details of its plans the company is not prepared to give.

The American Can Co. has moved its machinery from the building it formerly occupied at Davenport, Ia., to the new and larger structure which has been built during the last year. The output will be double that of the old plant.

Machinery is being installed in the plant of the Ottawa Motor Works, Ottawa, O., and the concern will be ready to start early this month.

J. H. Doering and Henry Moser are interested in the organization of a company at Wapakoneta, O., to manufacture harrows.

The American Car & Foundry Co. has secured a contract for 60 flat cars of 60,000 pounds capacity, for use in the Chihuahua & Pacific railroad, Mexico.

The Iowa Iron Works ship yards, Dubuque, Ia., have been sold to the Dubuque Boat & Boiler Works, which have been capitalized at $25,000. Offiecrs are: President, Captain John Killen; secretary-treasurer, J. J. Schreiner; superintendent, Charles Moy.

The pneumatic tool department of the Rand Drill Co. reports a steady increase in the demand for the "Imperial" hammers and piston air drills.

Frank-Kneeland Plant of the United Engineering & Foundry Co.

The manufacture of rolling mill machinery has naturally been centralized at Pittsburg, as the center of the iron and steel industry of the country. Most of the foundries in the Pittsburg district manufacture machinery of some kind for the rolling of iron and steel products, and the United Engineering & Foundry Co. is a consolidation effected several years ago of three plants located at Pittsburg, one at Youngstown and a fifth at Vandergrift, Pa. This article will be confined to a description of the company's Frank-Kneeland plant located at the foot of 54th street, Pittsburg, between the Allegheny Valley railroad and the Allegheny river. The site is well chosen, affording excellent shipping facilities and containing ample room for future additions.

The plant, Fig. 1 is a plan consists of a foundry, machine shop, erecting shop, pattern storage building and power plant. The castings from the foundry go by the shortest route into the machine shop located directly in front, and from the inside the lining. Two of the air furnaces are charged from the outside, the charging doors opening directly into the metal yard and even with the side walls. The third furnace, owing to its location, must be charged from the inside of the foundry.

Yard Equipment.

The metal yard is 225 feet long and 60 feet wide and is commanded throughout its entire length by a 10-ton electric crane. Two of the furnaces are charged by the aid of this crane, while a crane running at right angles to the yard crane into the foundry facilitates the charging of the furnace whose charging door opens directly into this building. This crane is of 5 tons capacity and has a span of 20 feet. It is also used for bringing material into the foundry from the yard. Coal for firing the furnaces is kept in bins inside the foundry, and so located that the firing is greatly facilitated. All pig iron, scrap and heavy flasks are kept in the metal yard, while bins are also provided for the storing of coke,

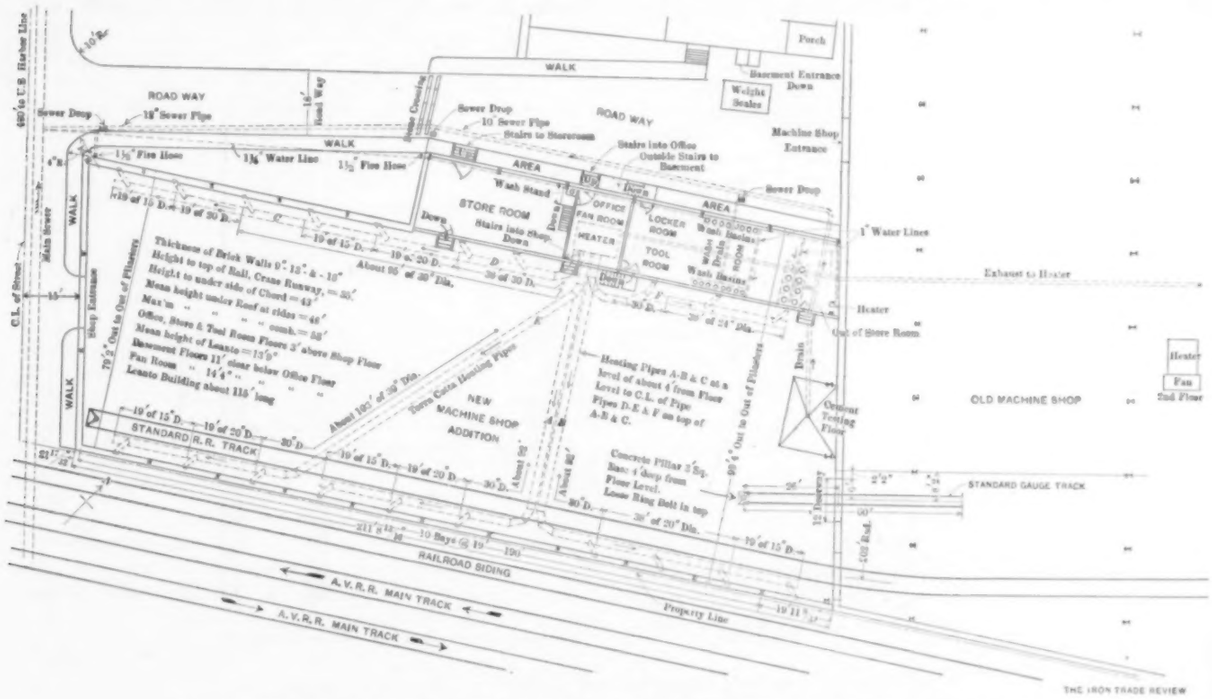


FIG. 1.—PLAN OF THE FRANK-KNEELAND PLANT, UNITED ENGINEERING & FOUNDRY CO., PITTSBURG.

machine shop into the erecting shop opening directly into the former. These three departments are laid out L-shape, with the erecting shop building forming the foot of the letter. As originally planned, rolls as well as the other parts of iron and steel works machinery were produced, but in the last few years no rolls have been cast, this work being done at several of the other departments.

The foundry, Fig. 2, is of brick and steel construction, 225 feet long and 100 feet wide, having two 20-foot lean-tos running its entire length on either side. On one side, and running 150 feet of its length, an annex 30 feet wide adjoins one of the lean-tos. The center of the foundry is commanded by two 20-ton cranes, electrically operated, having a 60-foot span and a clearance of 30 feet to top of rail. In the annex are located two cranes, electrically operated, having a span of 30 feet, and of three and five tons capacity each. Heavy castings are required in the construction of iron and steel works machinery and no bench holding is done, the heavy work all being done under the main span, while the lighter floor work is done in the upper portion of the annex, the lower end of this building being devoted entirely to the core department. Iron is melted in three air furnaces, two of 15 tons capacity each and the third of 25 tons capacity, and in a cupola 48 inches

coal and sand. A railroad siding parallels the foundry and machine shop throughout their entire length, running through the metal yard from which coal, coke and other material are unloaded. For storing the coal and coke, the material is loaded into boxes, and these in turn are lifted by means of the crane to a car running on a narrow gauge track on a trestle over the bins. The cupola is also charged from the metal yard, the charging floor being 50 x 25 feet and under the yard craneway. All pig iron charges are made up and weighed in the yard, while the scrap charges are weighed up on the charging platform. Ample room is provided on this floor for the storage of coke. Iron, coke and other material are lifted to this floor by means of the yard crane. Blast for the cupola is furnished by a motor driven fan. The furnace ladle pits are all located under the main foundry crane run, and the large ladles are of the bottom pour type, similar to those used in steel plants, a practice unusual for iron foundries.

Core Department.

The core department is located in the lower half of the foundry annex, and four ovens are used for drying cores. Three are for large cores which predominate in a foundry where castings oftentimes running up to 45 tons are made, while one oven is provided for the small cores. The ovens

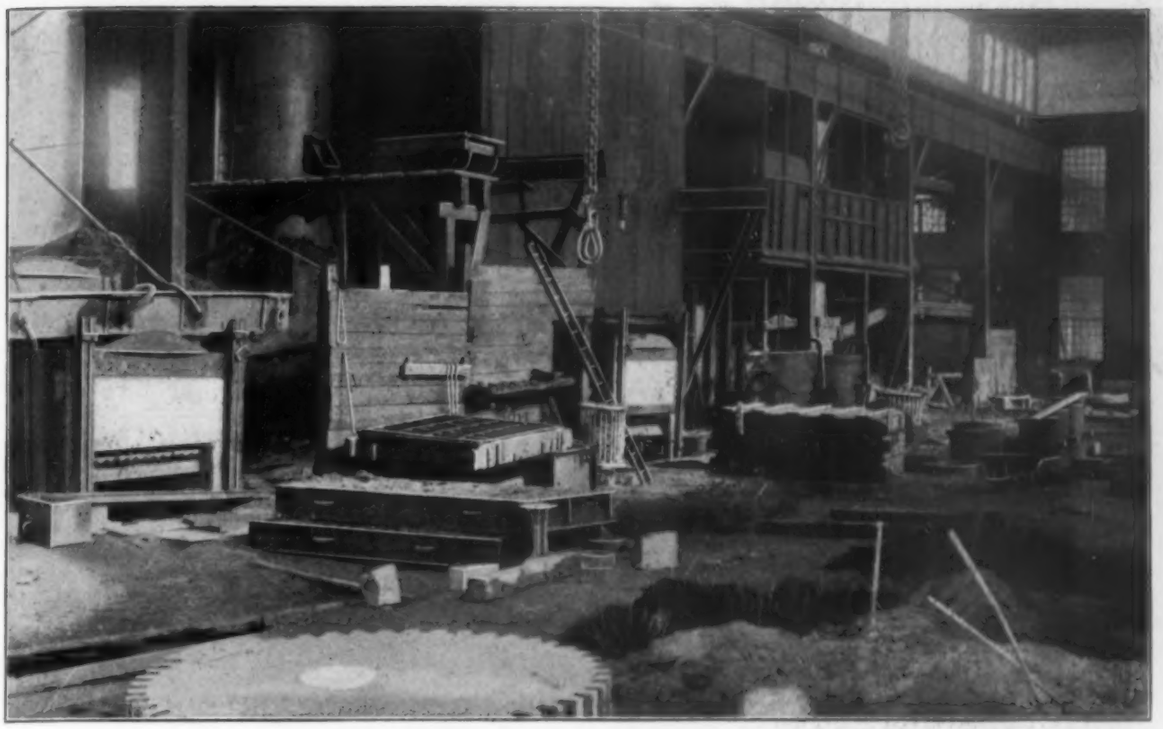


FIG. 2.—FOUNDRY SHOWING FURNACES AND CUPOLA.

open at both ends, one opening leading into the core department and the other into the foundry. This has been found to be an excellent arrangement, as the cores piled on buggies operating on a track can be pushed, after being dried, directly into the foundry through doors at the opposite ends of the ovens. The yard for the storing of light flasks adjoins the annex, and buggies operating on an industrial railway system convey the flasks from the yard into the foundry. A room for storing foundry supplies, 16 x 30 feet, is partitioned off in the foundry. All material required by the molder is kept in this room, and a requisition must be filled out for all material except blacking, plumbago, etc. This material is, however, kept in this room, and the molder must go to the storekeeper to have his boxes filled. This system, while entailing a slight additional cost, has been found profitable and has prevented much waste of material which occurs in foundries where the molders are permitted to help themselves to supplies. The carpenter shop, located outside the foundry, is 16 x 30 feet and is confined to the making of flasks.

The machine shop, Fig. 3, is divided off from the foundry by a brick wall having a large doorway through which castings are brought from the foundry. This shop is 240 feet long and 100 feet wide, having lean-tos its entire length 20 feet wide, the center span being 60 feet wide. The lean-tos are two

FIG. 3.—THE MACHINE SHOP.

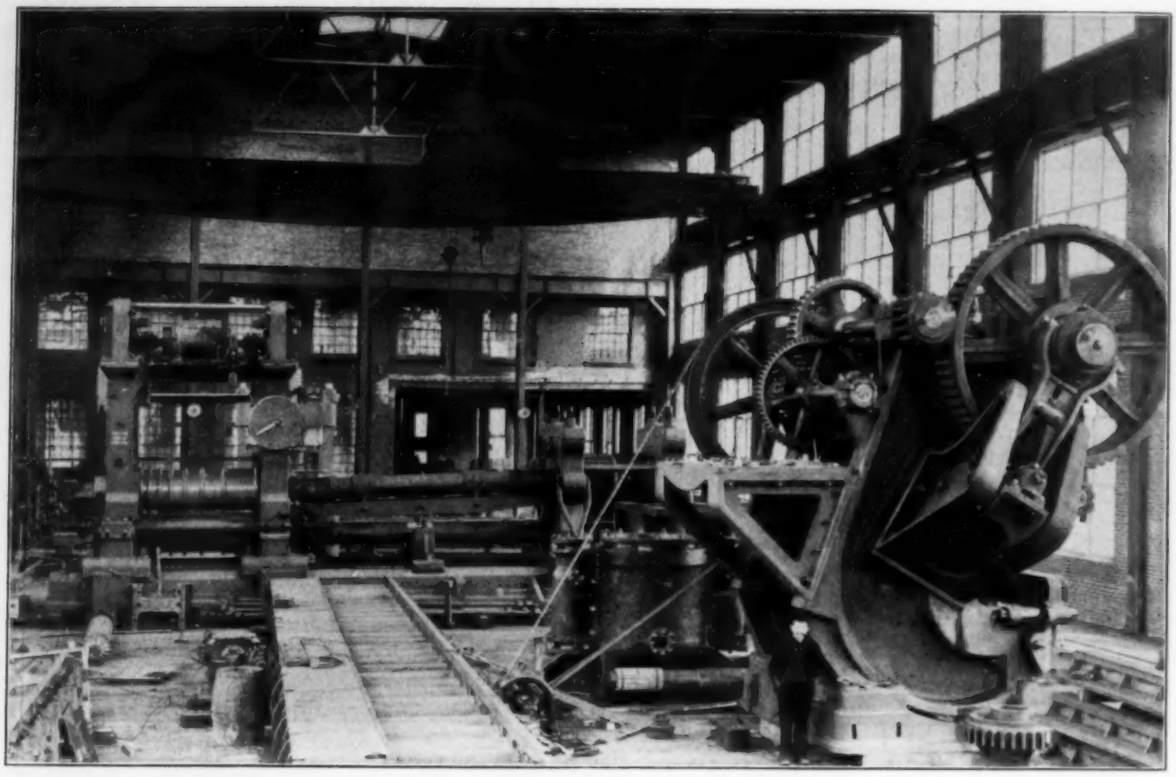


FIG. 4.—THE ERECTING SHOP.

stories high, the balconies being used for storage and pattern shop purposes. Two 20-ton cranes command the machine shop, having 60-foot spans and being 30 feet to top of rail. A standard gauge track leads from the foundry into the machine shop, on which is operated a heavy buggy by means of which castings are taken into the machine shop. The buggy, after being loaded in the foundry, is drawn into the machine shop by means of a chain attached to one of the machine shop cranes. All the large planers, lathes and boring mills are located in the center of the shop where the handling of large castings is facilitated by the cranes. All these large tools are driven by individual motors. The lighter tools are located in the lean-tos and are driven from motor driven line shafts. The pattern shop contains fourteen benches and is equipped with modern pattern shop machinery.

Erecting Department.

A siding runs through the front end of the machine shop into the erecting shop, Fig. 4, and throughout the entire length of the latter. After the castings have been machined, they are loaded on a buggy running on this railroad siding, and drawn into the erecting department by means of one of its cranes. The erecting shop is of brick and steel construction 220 feet long and 75 feet wide. In addition it has a lean-to 20 feet wide and 119 feet long. It is commanded by two electric traveling cranes of 20 and 50 tons capacity each, having a 75-foot span and having a clearance of 35 feet to top of rail. The railroad siding parallels the side wall of the building opposite the side to which the lean-to has been built. The location of the track close to the wall permits the use of all the remaining space in the building for the erection of machinery, and it has been found to be ample to set up the largest mills with large sections of their tables. After the machinery has been erected and tested the parts are loaded directly into cars which are brought into the shop on this siding. Three tiers of windows on each side of the building, a skylight in the center of the roof and hundreds of lights of glass in the front

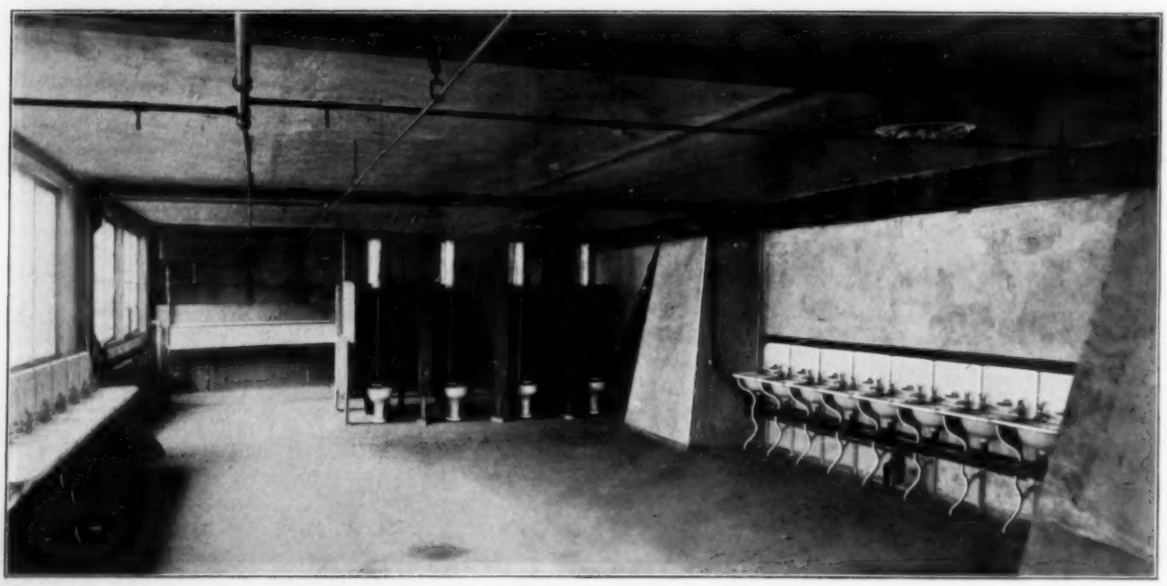


FIG. 5.—THE LAVATORY.

of the building provide the shop with ample light on the darkest days. Owing to the location of an oil refinery on the adjoining property, the windows in the front are all glazed with wire glass and have metal sashes. A basement is located underneath the entire length of the lean-to, one end being used as a store room, the center for the heating system and the other end for the lavatory. The latter, Fig. 5, is equipped with the most modern appliances, both hot and cold water being provided for the basins. The main floor of the lean-to is used for office and storage purposes.

Heating System.

Both the machine and erecting shops are heated by the hot blast system. The overhead system is employed in the machine shop, and the blast is furnished by one 110-inch Buffalo fan operated by a 20-h. p. motor, and one Sturtevant fan of the same size, engine driven. The erecting shop system consists of a 140-inch Sturtevant exhaust fan, in connection with which a system of steam coils is used for the purpose of heating the air before entering the fan. The system of coils consists of ten four-row sections of heater, arranged in double group, each group consisting of five sections, and the two sets being placed back to back so that the air passes over 20 rows of approximately 7,500 lineal feet of 1-inch pipe before entering the fan. The fan is operated by a 25-h. p. direct current motor, belted to the fan. The system of distributing the air is somewhat unusual, but the conditions particularly adapt it to the building. Terra cotta pipes laid underneath the floor receive the air from the fan outlet and carry it to various parts of the building. The outlets are placed next to the walls of the building where they are entirely out of the way, and at the same time delivering the heat at the point where it is most required. With high buildings of this kind this system of distribution is very desirable, as the heat is all delivered along the floor line and the hot air will rise naturally. The conditions made this system almost a necessity, but it has the added advantage of doing away entirely with the usual galvanized piping, and is entirely concealed, taking up no valuable space whatever, while the life of the underground ducts is practically indefinite.

The engine room, Fig. 6, is equipped with two 150-h. p. Harrisburg steam engines, direct connected to a Westinghouse generator; one 150-h. p. Westinghouse compound engine direct connected to a Bullock generator, and one 35-h. p. Walworth gas engine, direct connected to Western generator. The boilers are stoker fed and are of 400-h. p. capacity, amply provided with feed water heaters and pumps. The blacksmith shop contains four fires and one 600-pound hammer for light forgings.

Pattern Storage System.

The pattern storage building is of brick and slow burning construction throughout, three stories high, 135 feet long and 75 feet wide. An elevator is provided for carrying the patterns to the different floors, the first floor being used for the storage of the very large patterns that cannot be readily stored in the machine sections and racks provided on the second and third floors. The large patterns are carried in and out of the building on a buggy operating on a standard gauge track from which they are taken into the foundry. A bridge leads from the second floor of the pattern storage building to the balcony of the machine shop where the pattern shop is situated and any patterns requiring changes are taken into the pattern shop in this way.

The pattern storage arrangements can be best described by a brief reference to the system for indexing all machine patterns and subsequent changes in these patterns. In the card system for patterns each machine is given a number, the numbers running consecutively from 1 up. The first pattern made for the machine is designated by the machine number and the first letter of the alphabet, the second by the machine number and the second letter of the alphabet, and so on through to Z. After the 26 letters have been exhausted additional patterns are designated by the machine number with two letters of the alphabet, the first letter remaining constant and the second letter running through the alphabet such as 178-AA, 178-AB, 178-AC, etc., down through 178-AZ. Continuing this same system the second letter of the alphabet will remain constant and the fifty-third pattern of this machine would be known as 178-CA. Then would follow 178-CB, 178CC, 178-CD, etc., this system giving a possible 676 pattern numbers, which are more than ample for any one machine. The lead cards in the index in addition to containing the machine number designate the machine. In the instance in Fig. 7 the machine number 178 designates a 16-inch continuous mill and all the patterns for the parts of this mill are contained in this set. The lead cards are divided in thirds for convenience.

Fig. 8 shows a card containing the patterns of a roll housing. The machine number being 178 shows that it is the roll housing for a 16-inch continuous mill. The first pattern made was that of the left hand housing and is designated as 178-A, and its drawing number is 298. The first change in the pattern is designated as 178-A1. The numeral after the letter indicates that a change has been made in pattern 178-A and as the drawing number is 299 it denotes that another drawing has been made of the original with the change. In this case

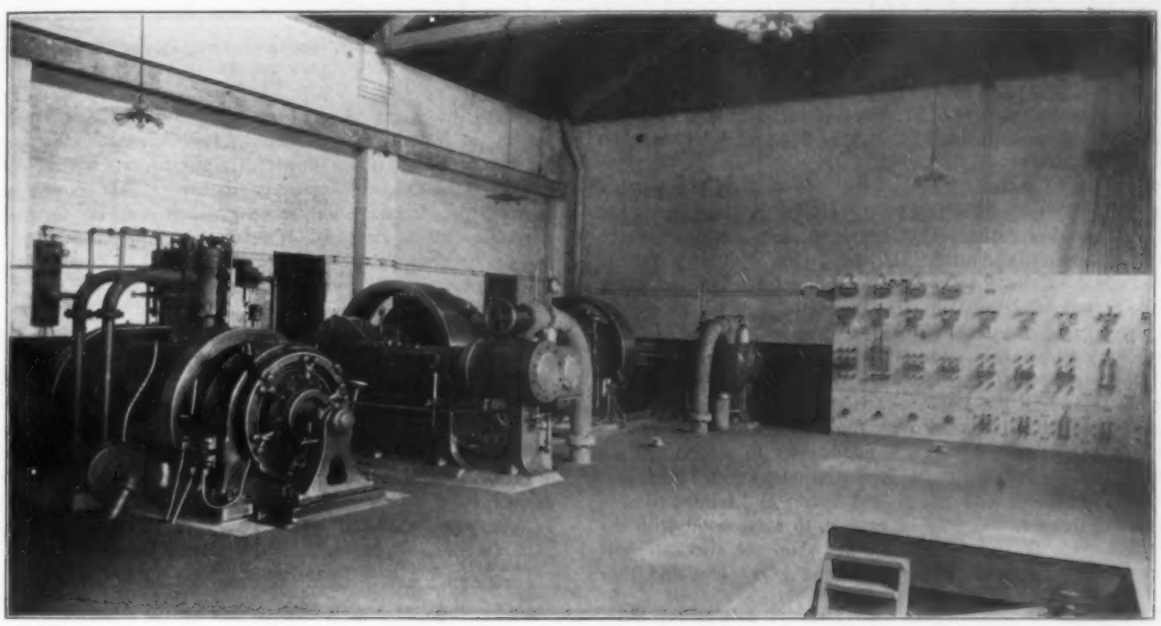


FIG. 6.—THE ENGINE ROOM.

the change in the pattern was from a left hand housing to one of the right hand. The next pattern is No. 178-A2, and the numeral denotes another change in the original pattern, and the drawing number 400 again denotes that another drawing has been made of the original with the change. In this instance the change in the original pattern was in the lugs on the brackets. The next pattern is 178-A3 and shows still another change; but as the drawing is No. 400 it indicates that the change was made on the same drawing as that made for pattern 178-A2. In this instance the bore was changed to 10 inches. All changes in the original pattern are denoted by numerals from 1 up following the letters of the machine part designating the pattern, while a change in drawing number denotes that the change in the pattern has been made on a

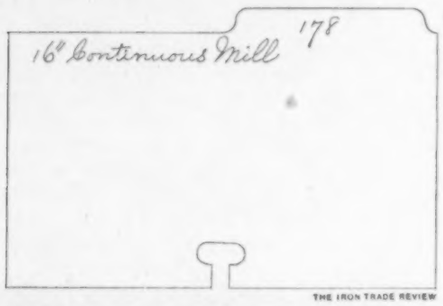


FIG. 7.—LEAD CARD FOR PATTERN INDEX. COLOR, SALMON. SIZE 3 X 5 INCHES.

separate drawing. Two or more drawing numbers of the same value indicate that the changes have all been made on this one drawing.

Patterns of parts of machines that are common to a number of machines such as gears, pillow blocks, flywheels, etc., are separately designated. This has been done to simplify the card system and the pattern storage system. Patterns of gears that are common to two or more machines are indexed under No. 13 and sub-lettered in the same manner as machine parts as 13-A, 13-AZ, 13-BA, etc. Flywheels, etc., are indicated by arbitrary numerals and the same system followed out.

In the pattern storage shop each machine is given a section to itself, and all the patterns for the machine, except those of parts that are in common with those of other machines, are stored in this section which is numbered. In section 178 are stored the patterns for the 16-inch continuous mill. Each pattern is numbered with raised lead figures and letters, as well as all changes to the original pattern, to correspond with the card index. Sections of the storage shop are also set apart for patterns of common parts, such as gears, etc., and they

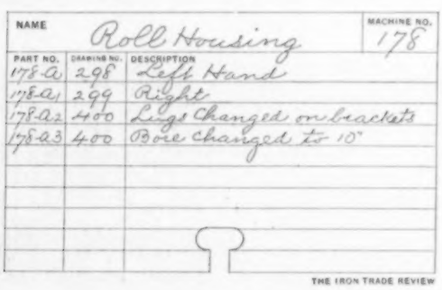

NAME
Roll Housing
MACHINE NO.
178
PART NO. | DRAWING NO. | DESCRIPTION
178-A | 298 | Left Hand
178-A1 | 299 | Right
178-A2 | 400 | Lugs changed on brackets
178-A3 | 400 | Bore changed to 10"
THE IRON TRADE REVIEW

FIG. 8.—CARD FOR PATTERN INDEX. COLOR, YELLOW. SIZE, 3 X 5 INCHES.

are also designated by the same method as the parts noted above. In case a machine has a gear or pillow block, or perhaps a flywheel, not in common with any other similar part of another machine, this pattern is stored in the section where the remaining parts of the machine are stored. The system of sub-lettering all patterns, and indicating all changes by numerals, acts as an additional check on mistakes that might be made in the foundry when an order is received for a casting. In case the foundry received an order for casting No. 178-A3 it would immediately indicate that a change had been made in the original pattern, and the part showing the change of making the casting would be proceeded with. In addition the pattern number is cast in raised letters and numbers on every casting in the machine, and the purchaser is further provided with a general drawing of each machine giving all pattern numbers to still further aid and act as a check on orders for duplicate parts.

System of Indexing Drawings.

Closely allied to the indexing of patterns is the system of indexing drawings. The index system for the drawings of all the plants of the United Engineering & Foundry Co. is kept in the company's drafting office at Pittsburg. The drawings are all numbered consecutively so that the number of

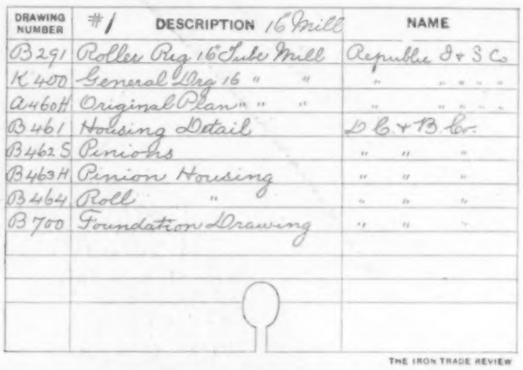

DRAWING NUMBER | #1 DESCRIPTION 16" Mill | NAME
B291 | Roller Rig 16" Tube Mill | Republic I & S Co
K400 | General Drg 16" " | " " " "
A460H | Original Plan " " " | " " " "
B461 | Housing Detail | D C & B Co
B462 S | Pinions | " " "
B463 H | Pinion Housing | " " "
B464 | Roll " | " " "
B700 | Foundation Drawing | " " "
THE IRON TRADE REVIEW

FIG. 9.—STRAIGHT INDEX FOR DRAWINGS. COLOR, WHITE. SIZE, 4 X 6 INCHES.

drawings made and on hand is always indicated by the number on the last drawing produced. Each card contains space for the indexing of ten drawings, and there is a lead card for every 100 drawings, or every ten cards. For convenience in filing the drawings only each class of machines is given a letter indicating drawings of details which prefixes the number of the drawing. Detail drawings of all mills are designated by letter "B," shears "C" and roll lathes "D." The prefix "K" indicates a general drawing and "A" a general plan. The card shown by Fig. 9 indexes drawings from 291 to 301. Drawing No. B291 indicates that the drawing is of a mill, and is the largest size drawing made in the drafting room. The drawings are all limited to three sizes, the largest being 24 x 34 inches inside margin, half size is 24 x 16½ inches and the small 16½ x 11½ inches. Odd forging sizes are made on drawings 7½ x 9½ inches inside measurement but are not indicated. The half and smallest sizes are indicated respectively by letters "H" and "S" following the drawing number. No

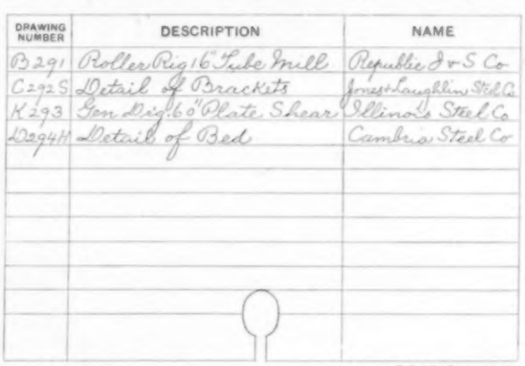

DRAWING NUMBER | DESCRIPTION | NAME
B291 | Roller Rig 16" Tube Mill | Republic I & S Co
C292S | Detail of Brackets | Jones & Laughlin Steel Co
K293 | Gen Drg. 60" Plate Shear | Illinois Steel Co
D294H | Detail of Bed | Cambria Steel Co
THE IRON TRADE REVIEW

FIG. 10.—CROSS INDEX FOR DRAWINGS. COLOR, WHITE. SIZE, 4 X 6 INCHES.

letter following the drawing number indicates that the drawing is of the largest size. In this way the card shows whether the drawings are located in the drawers for the large or half sizes, or in the case for the small sizes. Again referring to Fig. 9, drawing No. C292S indicates that the drawing is a part of a shear and is a small drawing. No. K293 indicates a general drawing and the description shows that it is of a 60-inch plate shear. No. D294H indicates that the drawing is one of the details of a roll lathe and that it is a half sized drawing, while the description shows that it is the detail of the roll lathe bed. The system just described is that of the

straight index and in addition a system of cross indexing is used.

In the cross system the lead cards indicate the type of machine and size such as that of 16-inch mills. All of the drawings made for these mills are indicated on the cards in this set, and the cards are numbered from 1 up, so that it may readily be seen whether any are missing. The lead cards are alike in shape but vary in dimensions to agree with index cards. Lead cards for design reference are blue and 4 x 6 inches. Fig. 10 shows card No. 1 containing partial list of drawings for these mills. For example, No. B291 indicates that the drawing is that of a mill and is on a full sized sheet, while A460H, indicates that the drawing is an original plan and is on a half sized sheet, the prefix "A" indicating that the drawing is that of an original plan. No. B462S indicates that the drawing is that of the detail of a mill, and "S" indicates that it is on a small sheet. In the indexing of these cards both for patterns and drawings it has been found more convenient to have the cards follow the lead cards than to have the lead cards follow the others. The drawers for filing the drawings are all conveniently marked and properly indicated, so that it is known at a glance the nature of the drawings contained and the size. In addition they are very shallow, permitting only a limited number to be placed in each drawer, thus making the task of locating them easier.

A bill of material is also shown on each drawing as illustrated in Fig. 11. Spaces are shown for six orders, but if additional orders are received extra spaces can be readily added. This shows the name of the concern ordering the material,

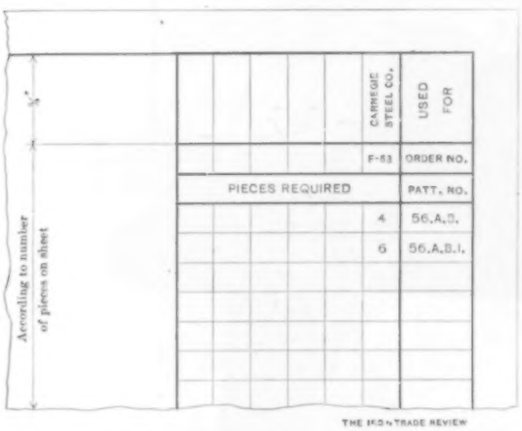


FIG. 11.—BILL OF MATERIAL ON CORNER OF BLUEPRINTS.

the order number and in addition gives the pattern numbers as well as showing the number of pieces required from each pattern.

New Books.

BY D. AG. ENGSTROM.

"Bevel Gear Tables" is written by one who has made a specialty of gear work and in order to obviate the necessity of calculating every gear has prepared a series of tables. These are inclusive of every bevel gear from 12 to 47 teeth. The first part of the work has tables and other data of gear tooth elements. These are given for diametrical and circular pitches. Complete explanations are submitted for using the tables and the tabulation includes the figures for outside diameters, placing diameters, outside cone radii, edge angles, face angles, cutting angles and numbers of cutters. The book requires no knowledge of trigonometry and is not claimed to be an exhaustive treatise on bevel gearing. It does give, however, the dimensions of such gears as are generally found in practice with the essential explanation. It will prove eminently useful to anyone having bevel gear work to do. The book is attractively printed and bound in cloth. Price $1. It is published by the Derry-Collard Co., 256 Broadway, New York. This company not only sends books on approval but has also an installment system of payment. The purchaser pays a certain amount monthly and may at any time order books equivalent to three installments in advance. The twelfth month is donated to yearly members.

AMERICAN CAN CO.'S REPORT.

The annual statement of the American Can Co., submitted at the annual meeting of the stockholders in Jersey City last week, showed an increase in net profits of over $1,500,000, which exceeds general expectations. The company reports the following results from operations for the year ended March 31:

	1904.	1903.	Increase.
Net sales	$22,919,524	$22,076,394	$ 843,130
Profit	2,394,510	886,711	1,507,799

In his report to stockholders President F. A. Assmann says: 'During the past year the remainder of the mortgages, amounting to $113,000, assumed by the company, was retired. The company has no floating debt nor debt of any kind, except for current accounts, and all bills are discounted when discountable. The company is in good financial condition, having sufficient capacity to transact its business economically.' This increase in volume of business has been obtained in the face of lower average prices for our products. The company, therefore, has made fair progress in increasing its business and the improvement in the business conditions of the company during a period of generally dull trade throughout the country is gratifying and encouraging for the future prospects of the company. The benefits of concentrating our work in fewer factories, with better machinery and supervision, have been demonstrated. Improvements in machinery and methods are constantly being devised and put into effect. In the last year the number of factories in operation was still further reduced by five, and the company is now operating in 31 can factories and two machine shops. The two detinning plants referred to last year were completed and have been in successful operation during the past year. The prospects for business during the coming year are good, as shown by orders and contracts now on hand."

O. H. Bogue was elected a director to succeed C. S. Guthrie. Other directors were re-elected and G. G. McMurtry was elected a member of the executive committee to succeed Henry Akin. Resolutions were adopted approving the acts of the board of directors and the executive committee for the fiscal year. After the adjournment of the stockholders' meeting the directors met for organization and elected F. S. Wheeler treasurer and D. G. Reid additional vice president. The position of treasurer has been vacant for a year. H. M. Norton was elected vice president in place of A. Apfel, and R. L. Skofield a director in place of A. Apfel. J. H. Sturgis was elected auditor. Other officials were re-elected.

The Whiting Foundry Equipment Co. will exhibit one of its three-motor electric traveling cranes, 10 tons capacity, 45 ft. span, in the model foundry building at the World's Fair. This crane will be of the latest design and will be operated in the foundry during the fair.

The new wheel foundry which the Pennsylvania Railroad Co. is erecting at Altoona, Pa., is fast nearing completion and will be placed in operation about July 1. It will have a capacity of 1,000 wheels a day. Work on the gray iron foundry is being pushed but it is doubtful if it can be completed before fall.

The Zanesville Mining Tool Co. and the Union Machine Co., both of Zanesville, O., have been consolidated. All machinery of the tool company will be moved to the shops of the Union Machine Co.

The Conway Stove & Range Co. will soon occupy its new building in Toledo, O. Steel ranges and gas stoves will be manufactured.

The McKenna Steel Working Co. has reopened its plant at Armourdale, Kan. The plant had been idle for three years.

McArthur Bros. & Co. have the contract for stripping the Hawkins mine at Nashwauk, Minn. A large force of steam shovels and men is now at work.

NEW HARTNESS FLAT TURRET LATHE.

The newly designed Hartness flat turret lathe is about as radical a departure from current practice as was its predecessor of the same name and general type. It is made in two sizes with outfit of tools for bar work and chucking purposes. The 2 x 24 size turns work up to 2¼ inches in diameter and 24 inches long, chucking work up to 12 inches in diameter. The 3 x 36 size turns bars up to 3 inches diameter and does chucking work up to 14 inches in diameter. In the present innovation the firm maintains the well known claim to furnish a machine with an outfit of tools to cover almost any shape of work within the set diameter and length limits and at the same time has increased the working diameter to 12 and 14 inches respectively. The tools requisite for the machine have all the characteristics of the old type and are as efficiently held under rigid control.

A glance at the various views of the machine will show that the greatest changes have been made in the head and bed and that the turret is substantially the same as furnished on the earlier type of Hartness lathe. Although this is true as a general proposition it is a fact that many changes have been made of a minor but important character in the construction of the turret and slide as well as in the tools mounted on them. All these changes have been made directly in line with the plan that the Jones & Lamson Machine Co. has found from its extended experience with the old "2 x 24" would prove most valuable and acceptable to the user of the tool.

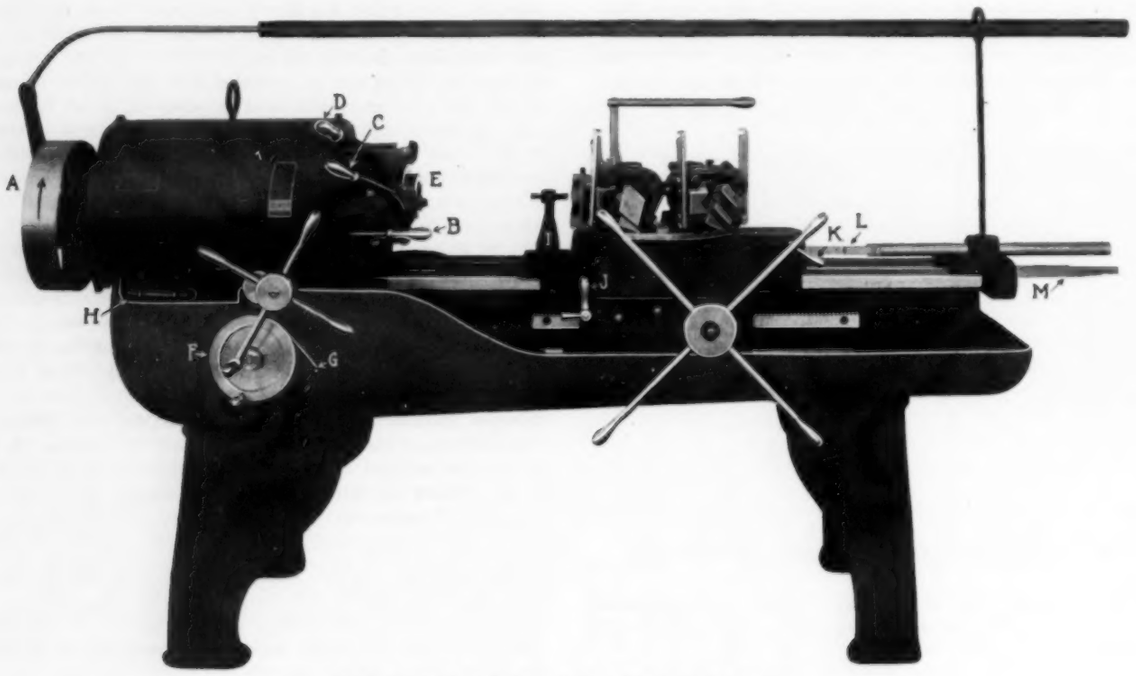


FIG. 1.—THE NEW HARTNESS FLAT TURRET LATHE.

The various elements of the machine are designated by letter in Fig. 1 and the other views show the tool from different angles and also depict the turret equipment and the cooperative action of headstock and carriage in finishing some samples of work. The power for driving the lathe is received on a single pulley, A. This may be belted directly to a constant speed motor placed on the floor or the ceiling above, or it may be belted to a single countershaft overhead. The headstock contains all the necessary gears for effecting changes of speed in both directions so that it is not imperative to resort to the complications or expense of outside devices. All the gears, clutches and bearings for these parts are held in a headstock having the form of a hollow pan and from this source a liberal supply of oil reaches the lower half of the running parts, thus ensuing perfect lubrication and freedom from the usual troubles incident to the use of clutches and gears. This ideal lubrication is not only provided for all the clutches and gears leading up to the spindle but the same scheme provides for the lubrication of the main bearings of the spindle itself. The main bearings are moreover self-adjusting.

The entire mechanism of the head is covered by a cast iron hood. This bonnet is conveniently removable if for any reason it is necessary to inspect the running parts but the especial care of the designers has been toward the construction of a headstock that would run without attention. The headstock has the peculiar property of movement at right angles to the bed. It is mounted on guideways running across the machine and it is possible therefore to give the work a cross feed directly relative to each tool on the turret; or in other words, there is a cross feed for every tool.

It is due to this important departure in lathe design, the use of a cross feeding headstock, that the manufacturers have been able to include a great range of chucking work in cast iron and steel, in addition to the regular bar work handled by the previous type of Hartness flat turret lathe. The headstock is also equipped with mechanism for instantly effecting changes in speed variation and in a similar manner provision is made for variation of the feeds for the cross slide and the turret.

The sliding headstock has ten stops for the cross feed, as is best seen in the end view in Fig. 2. The variation in the speed rate of the main spindle is controlled by the lever at B, Fig. 1. The back gear lever, C, gives three additional rates of speed and D is the chuck lever operating the chuck at E. The power cross feed lever is located at G, and H is the oil pump. The feed variator is shown at F. The shipper is conveniently made an integral part of the machine and suitable motion of the one lever by the shipper rod starts the lathe forward, stop or backward as may be desired by the operator. The shipper rod extends the full length of the machine.

The present turret slide diverges from the original design, the 2 x 24, in being provided with twelve stops, two for each position of the turret, and either one may be used in either direction. The rack for turning the turret is shown at L and the twelve stops, two for each position of the turret, are seen at M.

The handle K at the rear end of the turret slide is arranged so that it can throw out all the stops whenever it may be desired to move the turret beyond any one of them. This handle may also be employed to throw out either one of the two stops that are available for a given position of the turret. The carriage feed is operated at J, and I is the swinging stop for adjustment of the stock in the chuck.

The feed stop mechanism for the turret is designed with the end in view that the feed will draw the carriage forward

with a maximum pressure against the positive feed stop and then hold it there firmly until disengaged by the operator. The usual practice involves the setting of the positive stop a thirty-second of an inch ahead of the knock-off for the feed, and in the operation of a machine by that method the feed would knock-off and then the turret slide, relieved, would spring back with the release of all its parts and the tool jump in and cut a slight groove just back of the shoulder. The careful workman in recognition of these conditions would be compelled to change the order of procedure on nice work where the shoulder length was very important. He would take the time to move the turret slide against the stop and hold it there with as nearly as possible uniform pressure until the turner had surely faced its full length. The present machine imitates the action of the careful workman with considerable nicety, with greater certainty of exercising a uniform pressure and with less waste of time. The turret is always fed against the positive stop and held there, insuring accurate results in turning to length. The same stop mechanism is used in connection with the ten rotary stops for the sliding head.

A close inspection of the turners and some of the other tools will show that provision has been made for the oil to come up through the turner casting. The oil pump delivers into a pipe that is connected to the under side of the turret carriage

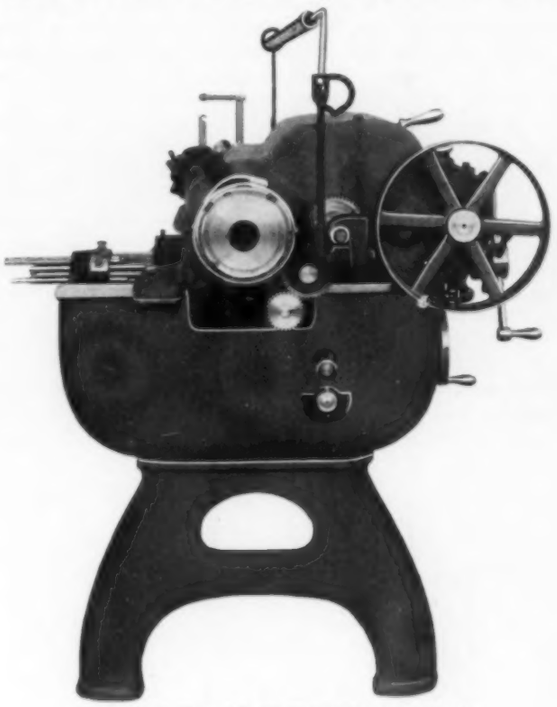


FIG. 2.--END VIEW OF FLAT TURRET LATHE.

and the lubricant passes up through the turner that is in working position and comes out from a rectangular hole immediately above the cutting tool and issues there in a large and slowly moving solid stream. This plan abandons entirely the swing joints and long pipe sections previously used for such purposes.

The illustrations, Figs. 3, 4, 5 and 6, present classes of work the machine is capable of handling to advantage. These examples are purely typical, however, and a little consideration will suggest many forms that may be easily machined in bar and chucking work, both in steel and iron, on account of the varied provision for bringing turret and cross slide up to fixed stops either by power feed or with quick adjustment by hand. The ten stops for the cross feed of the head in combination with the twelve stops for the turret and the equipment of simply constructed turning and boring tools, render the machine ready for work when equipped with driving power.

All the shears and running surfaces are protected from the dust of cast iron so that the machine may be used for either steel work in which oil may be employed, or for cast iron chucking. Some further definition of the last phrase may be desirable, as chucking in this instance does not mean merely boring a rough hole in a piece of work which would be reamed elsewhere by hand or in some other machine, then forced on an arbor and again put into a machine for turning, etc. The engravings present views of work in which a variety of operations is undertaken and still leave means in each case for holding the piece in its original setting.

The makers of this machine tool, the Jones & Lamson Machine Co., of Springfield, Vermont, submit in the latest flat turret lathe another instance of the builder's confidence in restricting the capacity dimensions to fit average conditions. The situation will be readily understood by any designer who

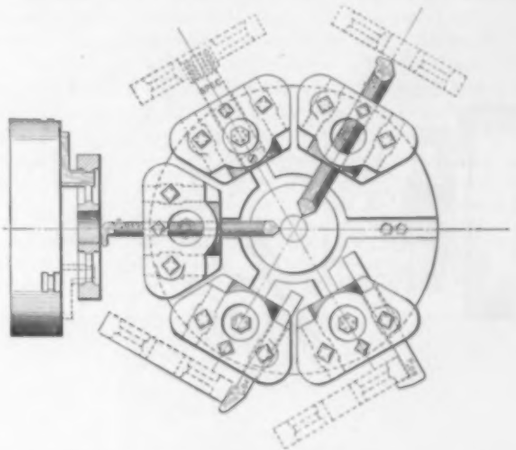


FIG. 3.—MACHINING GEAR BLANK ON FACE AND BOTH SIDES RIM AND HUB AT THE ONE SETTING.

has had the task of developing a stiff machine with large selling dimensions, the tool that will "take most anything that comes along." Just as in the past the Hartness machine was restricted in its working dimensions to a 2-inch hole in the spindle, so is the new design limited in chucking swing to 12 and 14 inches. This is of course fitting with the fact that managers in purchasing machinery look to the greatest efficiency for a given class of work in preference to the installation of machines with overlapping dimensions.

The annual meeting of the stockholders of the Joseph Dixon Crucible Co. was held at the company's main office, Jersey City, N. J., Monday, April 18, and out of a possible vote of 7,345 shares, there were 7,126 shares voted for the re-election of the old board, consisting of Edward F. C. Young, John A. Walker, William Murray, George T. Smith, Edward L. Young, George E. Long and Joseph D. Bedle. President E. F. C.

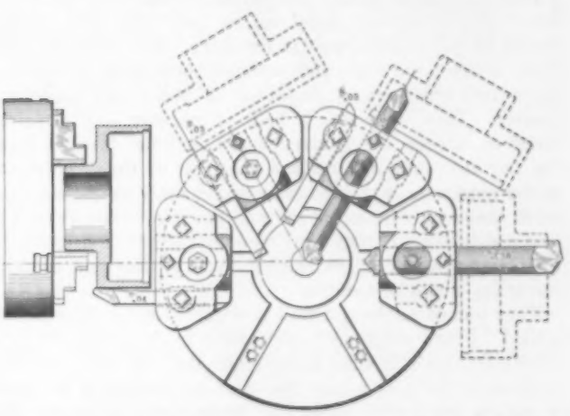


FIG. 4.—ANOTHER EXAMPLE OF HARTNESS TURRET LATHE WORK.

Young, Vice President and Treasurer John A. Walker and Secretary George E. Long, were re-elected by the directors. Judge Joseph D. Bedle was also re-elected as counsel.

The White Mfg. Co., manufacturer of gasoline and kerosene appliances, Chicago, whose plant was recently visited by fire, has secured a large plant in Chicago, where its facilities will be twice as great as those which it formerly had, and within a week the company will be able to take care of orders.

EXCEPTIONAL PAY FOR THE "EXCEPTIONAL MAN."

BY E. O. PALMER.

In nearly every issue of the different mechanical publications there is some article of more or less importance, either for or against the "piece work system," and we are apparently as far from a satisfactory settlement of the question as we were when antagonism was first manifested to this method by the metal working trades. I have never been so fortunate yet as to find an expression or an idea on this line that was absolutely

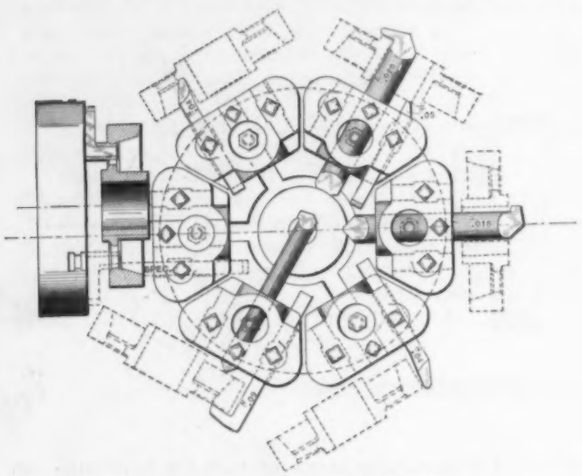


FIG. 5.—EXAMPLE OF HARTNESS SYSTEM.

fair to the workman. In *The Iron Trade Review* of April 7 the question is handled very masterfully from his point of view by Mr. C. D. Rice of the Underwood Typewriter Co., but it is just this method explained by him that breeds suspicion and lack of confidence between the mechanic and his employer. I have, until very recently, had charge of the machinery department of a "piece work shop" and know whereof I speak in regard to this question.

When this system was adopted in the above mentioned shop the prices were made from the average daily production of the ordinary mechanic, not the exceptionally fast nor the exceptionally exact workman, but the ordinary mechanic; a class of workmen which is in the majority and has to be put up with. I have yet to learn of a shop where the workmen are all "exceptionally" good.

When the company adopted this method they assumed that these piece work prices were the best obtainable and consequently were economical, considering further that the confidence of the employe would not be lost. The men rapidly became more proficient, took better care of their tools, invented little devices and jigs and assisted themselves in various ways until their wages amounted to about time and one-quarter. Then there was a halt. Persuasion and promises failed to increase the production and inquiries brought forth the fact that they had reached the limit of their confidence in the employer. Previous examples in other shops had educated them and the suspicion was based on experience and was convincing. If they used their best efforts and increased their earnings to even an amount equal to time and one-half the prices would be reduced.

They looked at the question in a fair way, as must be admitted. If our employer could afford to pay us $2 for producing an article in eight hours under the "day work system," why cannot he now pay us the same for producing the same article in five hours under the "piece work system?" His production as a whole is greater and consequently his profits increase. Those directly in charge of these men could not give any positive assurance that the price would remain the same regardless of the earnings, and the workmen would not increase their earnings on account of the "exceptional earnings" idea.

I have stated that they would not increase their earnings. Many will say that this is a condition which ought not to exist; that force should be applied when necessary and some will have disagreeable memories of the time when they learned by hard experience that this condition does exist today. Mr. Rice mentions "exceptional earnings" but this is indefinite from a workman's point of view.

The mechanic claims that if he use extra efforts or take advantage of his spare time, outside of working hours, in making himself more proficient—and in these days there are many opportunities—he has increased the value of his labor and should be compensated accordingly, above his less ambitious brother. I feel free to say that it is this "less" ambitious brother who will raise objection to the "exceptional earnings" and will cause the discontent mentioned by Mr. Rice.

How many in a like position to that of the above mentioned correspondent are receiving "exceptional earnings" for their services? If we are going to enjoy the confidence of the workman we must look at this question from his standpoint. In his opinion it is as little possible for him to receive "exceptional earnings" as it is for his more fortunate foreman. This is not to say that our ideas and his should all agree but that a small portion of the "Golden Rule" should be used in many instances.

The case of the employe mentioned who "makes very high wages and out of all proportion to what he really earns" is not entirely clear to me. This employe, for instance, starts in when the price is first made on an article. He produces that article for twenty-five cents and possibly makes $2.50 per day. He continues to make this article for some little time. One evening in looking over some mechanical publication he reads an article whereby a similar operation is being done at another plant in a much shorter time, not by the addition of any special jig or fixture, but by the use of a little "gray matter." He adopts this method and learns that he can produce enough pieces to bring his earnings up to $4 per day. He makes the change without explanation and continues until the superintendent discovers that the production of this article is increasing faster than it can be used by the assembling department. An investigation shows that this operator has made $24 in one week, while his old average was $15. Immediately that man is placed under suspicion. He must have slighted his work or has conspired with the inspector to defraud the company. No; the work is perfect and the count correct. When the workman is approached regarding the output, he explains his new method and straightway the price is reduced. Why? Because the man working beside him, who is

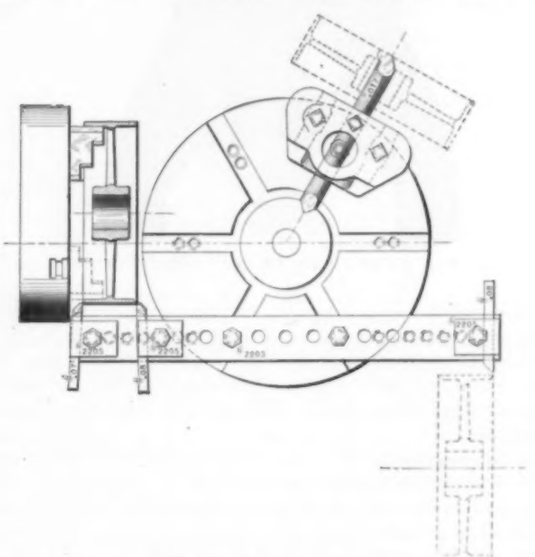


FIG. 6.—EXAMPLE OF HARTNESS SYSTEM.

waiting for the whistle and who spends his evenings at some place of recreation, can only make $2.50 per day. This example is perhaps somewhat overdrawn; nevertheless similar instances have occurred.

This may raise the question: Had the superintendent in charge been attentive to business and capable of making "exceptional earnings" he would have discovered this over-production before any harm had come of it. Many superintendents know or will realize the fact that after seeing a man perform one operation day after day he will become blind

to the operation itself and will only see that the man is busy which is sufficient, ordinarily.

The skillful workman, being thoughtful, will naturally want an explanation as to why the price has to be changed. We cannot enlighten him by saying that he is earning too much. He will not be able to see it in that light. He is working for his own advancement, financially and socially, and may even hope that his efforts will be appreciated and that there will come a time when his services will be sought for as superintendent or manager receiving "exceptional earnings." He asks the question, "Is the machine of which I am making a part going to be sold at a lower figure than heretofore on account of my increased production and the consequent cut?" He is told that the price of the machine as a whole will remain the same. This is where we arouse that germ of socialism, that especial germ which preys upon a man's mind and leads him to believe that he is entitled to some portion of the increased profits which he has helped his employer to make. Who is going to blame him for these thoughts and who can imagine how many have received their first lesson in socialism in this or a similar manner? Yet each year as we make agreements with our organized employes we find that the larger percentage of their grievances have an interlining of socialistic principles and we blame them for their foolish political education.

Experience and proficiency are not quoted on the bulletin; nevertheless, they have a face value and should be purchased as such.

I have never learned of an instance in America in which the introduction of a new machine, which would increase the production and cause a reduction in price per piece, has caused a labor difficulty, or that there has been a successful objection made to such machine by a single employe.

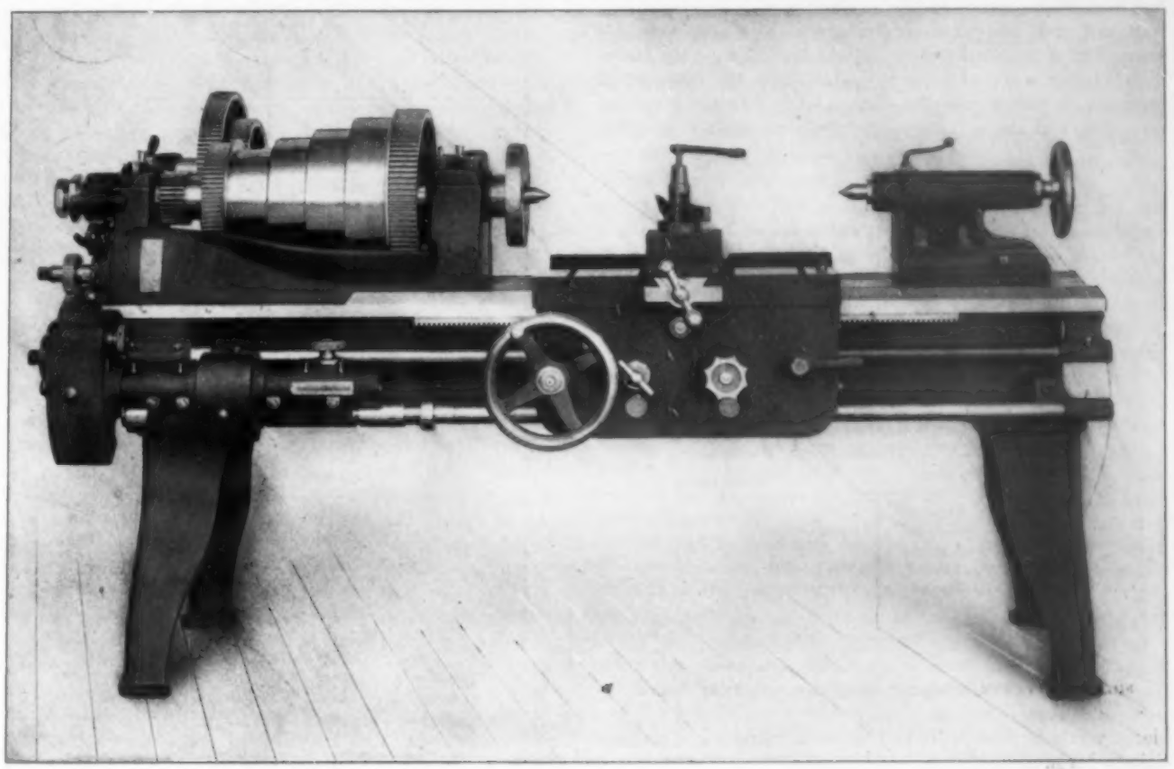
T. J. Geisler, of Portland, Ore., is endeavoring to reorganize the Rigby-Clove foundry and machine shop of Pendleton, Ore. The shop went into bankruptcy and has been closed for the past month.

The Watson-Stillman Co., on May 1, removed its offices and a large stock of goods to 46 Dey street, New York City. All of its machinery is being moved to its new works at Aldene, Union county, N. J., where there will be ample room to expand.

NEW 18-INCH HIGH SPEED LATHE.

The increasing use of high speed steel has been the cause of much reconsideration of the old designs in machine tools, and in the new 18-inch lathe of the F. E. Reed Co., of Worcester, Mass., the problem was approached from the conviction that the best of the so-called high speed steels were far ahead of lathe construction. The belief that up to the present time nothing had been produced in the way of a machine for turning steel or cast iron up to the full swing of the lathe and the capacity of modern tool steel, led to a series of experiments. The plant facilities were decidedly favorable for demonstrating the power required for high speed and heavy cuts as well as the strength necessary in the feed works and other elements to handle the strains satisfactorily. It is claimed that the machine now illustrated is ahead in the struggle for supremacy between lathe builder and tool steel maker; that the lathe has more power in the head and more strength in the feed works than any of the high speed tool steels will meet when cutting to the limit of endurance.

The headstock spindle has a front bearing of 3¾ inches diameter by 7½ inches long. The illustration shows the lathe spindle with a 4-section cone pulley, the largest step being



A NEW HIGH SPEED LATHE.

15 inches in diameter and wide enough for a 3½-inch belt. There is also a small ratio and a large ratio of back gears. With an open belt and the small ratio of back gears iron or steel may be turned up to 5 inches diameter and at the same time cutting at as high a peripheral speed rate per minute as the best tool steels will stand. A proportionate depth of cut may be taken with ample power and at any feed desired from 40 to as coarse as 8 to the inch. With the large ratio of back gears any work may be done in the lathe from 5 inches diameter up to the full swing of the lathe and in either cast iron or steel. The diameters of the cone pulley and the ratio of the gearing are so chosen that the lathe has a regular graduation of spindle revolutions per minute from 400 to 10, and this gives sufficient range for turning any diameter up to the full swing of the lathe at any desired cutting speed.

The rest is necessarily extra heavy and has a bearing on the bed for its entire length, or 36¾ inches long, and is strongly built with good measure of metal to meet severe strains stiffly. The feed mechanism is constructed in harmony with the rugged proportions of the rest of the machine and the general appearance of the design as brought out in the halftone illustrates the skill with which the added metal has been incorporated. The ways on which the rest slides have more than twice the wearing surface of the ordinary lathe of this swing and cutting tools may be used as large as ¾ x 1¼ inches. The lathe can be furnished with pan, pump and piping for flooding the cutting tools with water or any lubricant.

STAFF AND DEPARTMENTAL ORGANIZATION

BY HUGO DIEMER.

When, by reason of increased business, a manufacturing establishment finds it necessary to erect an extension, or to put up a new plant, the progressive firm seldom plunges headlong into building. The necessity for alteration leads to a careful investigation of such matters as the travel of work through the factory, the maintenance of proper balance of floor area, the provision for a rational growth, an investigation of machine tool and power equipment, and other important considerations.

In the planning of extensions and new buildings, the owners of a business often find it profitable to employ the services of experienced mechanical engineers, so as to relieve their own superintending staff from the additional labor involved in such planning—a strain which, without outside assistance, might seriously handicap the regular productive work of the factory. Hand in hand with the evolution of the mechanical equipment should go the development of the staff and departmental organization. That this development does not keep pace with that of the mechanical equipment is easily explained by the fcat that with respect to the equipment, the superintending staff and their assistants are craftsmen, with a considerable knowledge of technical matters beyond the limits of the immediate routine work of each individual. On the other hand, the men on whom falls the burden of the routine work of recording, and also a large part of the planning, are too often

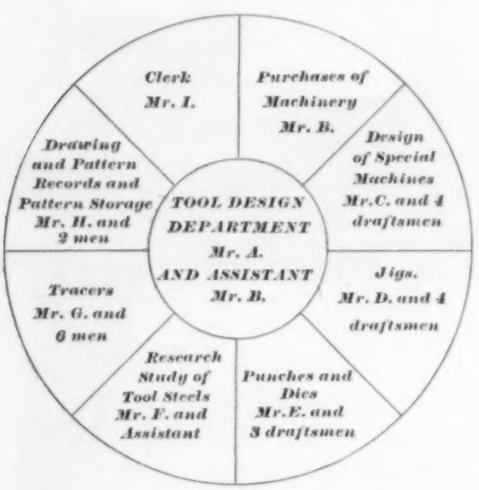


FIG. 1.—DEPARTMENTAL INTERNAL ORGANIZATION CIRCLE.

clerks whose horizon is limited by the working hours and the dollars per week wages.

The actual execution of the direct productive work in the factory is but an intermediate step between the planning of it and the recording of it. There is bound to be in every factory employing over one hundred men, some sort of organization or departmental division of this work of planning and recording. In some factories the supervision of this force devolves upon the superintendent. In other works some corporation officer, such as the secretary, or vice president, assumes direct charge of it. From my own observation, I should say that the most efficient planning and recording forces that I have seen have been in establishments where their supervision was undertaken by a corporation officer making a study of this work his sole occupation.

In making a study of the existing organization of the planning and recording departments, the first step is to write out a functional list, without names of individuals, showing the duties of each department and of each man in each department. With this functional analysis as a basis, there can be built up such an impersonal functional list or chart as appears best adapted to the company's conditions. The complete removal of the personal element is absolutely essential. After the new chart has been prepared, comes the selection of each man, of that man above all others that will best fit each place.

Simply as an example of what such a functional list might be, and without any intention to dogmatize, the following possible list is presented:

1. Entering and classifying orders.
2. Designing of output.
3. Designing of tools and machines.
4. Preparation of specifications and bills of material.
5. Requisitions on purchasing department if this department is not at factory, or purchasing department itself, if at factory.
6. Stores department.
7. The routing of work through departments.

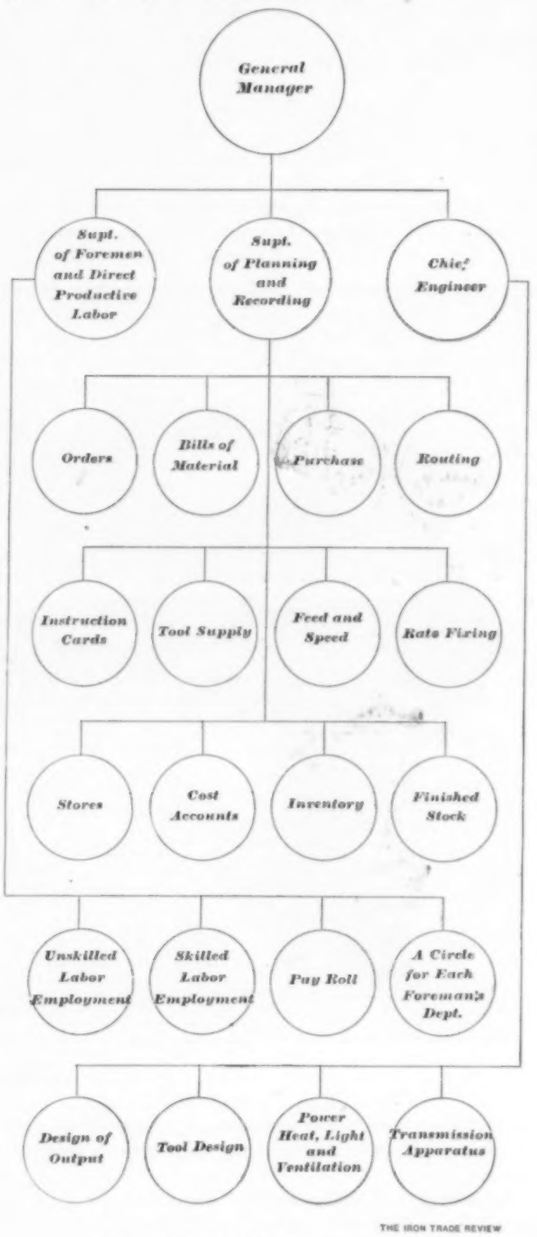


FIG. 2.—GENERAL ORGANIZATION CHART.

8. Instruction card covering individual departmental operations.
9. Specification of and providing for tools with which work is to be done.
10. Feed and speed of machines.
11. Fixing of time required for all operations.
12. Piece rates, premiums, bonuses, etc.
13. Pay roll.
14. Cost accounts.
15. Finished stock.
16. Inventory.
17. Employment of unskilled labor.
18. Employment of skilled labor.
19. Maintenance of power, heating, ventilating and lighting apparatus.

20. Maintenance of transmission apparatus.

After the listing of each distinct departmental function, outside of the direct productive departments as above, or including the direct productive departments also, the next process is the merging together of such departments as must necessarily be combined in establishments of moderate size, which cannot carry a list as long as the above, of distinct departments. The distinct listing of functions is advisable, however, whether each function represents a department or not. The next steps in this direction would be the charting, first of the organization as it now exists, and secondly, of any improved or ideal organization which it is hoped to secure.

There is probably no better method of charting than that of circles connected by lines or arrows, each circle representing a department, and the lines or arrows representing either their subordination to each other, or, by some different type of line, their geographic juxtaposition, or the manner in which the work is handled first by one department and then by another. This method of charting was first used by Messrs. Garcke & Fells, and adopted by J. Slater Lewis and subsequent investigators into the matter of factory organization. Fig. 1 is an example of this method of charting applied to internal departmental organization. This example will suffice to show the method of division of duties coming under each functional head. I believe it to be a good plan for each department to have a chart showing the organization within that department, as well as a chart of the general factory organization, so that each man may see his place and not labor under any delusions as to his authority or his prospects. In Fig. 2 is presented a form illustrating this method of showing the general organization scheme. The scheme here shown is presented merely as an example for illustration.

The advantage of a study as above suggested is that it tends to bring about a departmental system of interlocking but independent units. It will lead to the encouragement and better satisfaction of the men employed in the planning and recording departments by offering them a departmental headship rather than a mere clerk's post. This will offer a stimulus to ambition which will attract men of better mental caliber than can be obtained under a loose and poorly defined system.

The factory system as it exists today presents as wide a range of physiological structure as does the whole animal kingdom. We can well compare some establishments to a mass of protozoa. Others may be likened with justice to the highest orders of vertebrates, with their complex systems of organs, muscles and nerves. In the lower and extinct types of animal life we find beings with few organs, and often with the same organ many times duplicated. As the ages have passed these types have decreased in number, being unable to resist the more highly developed classes. In the higher types we have no duplication of vital organs. The same is true of factories. The crude types, lacking in some organs and with much duplication of functions, must pass away and give place to the vertebrate type, with its higher physiological development.

It is evident that the art of administration as applied to the newer, larger and more complex establishments becomes of constantly greater importance. This art of administration demands a knowledge of all details of the interior workings of an industrial establishment. The process of building up an organization that shall be the best for a certain factory, depends primarily upon scientific research work, having for its object the dissection of the entire series of internal workings into the elementary steps. Following this analytic process comes the even more difficult synthetic one of preparing a structure which shall be the most efficient possible engine of industrial warfare of its type.

The great advances in the construction of heat engines have depended to a large extent upon researches which brought to light the conditions during the minutest fractional part of a second representing any instant in a single stroke of the piston. It is only by ascertaining and recording continuous running conditions of our industrial engine, the factory, and an analysis equal in refinement to that employed in engine tests that we can apply modifications and improvements to produce higher efficiency.

From the foregoing it follows that he who would deal with questions of factory organization must understand, first of all, manufacturing processes; also that he must be able to make precise observations and that he must be able to record systematically the results of these observations. Continuous records and comparisons of all steps in the workings of a factory are essential to successful management.

Thus far considered, the question of organization has been wholly a physical one. A man with engineering education and understanding the principles of accounting and statistics could work out the physical organization of an industrial establishment. I do not exclude from this scientific treatment of factory workings the questions of time required to do the various operations and the compensation therefor. These are most fit subjects for scientific inquiry, and indeed such treatment is the only one which can bring about absolute fairness. The phases of the factory system which may be included in the list of those most susceptible to the methods of applied science are those having to do with location, design, equipment, organization, wages and accounting.

Our physical organization having been drafted, it remains to select the men to fill the positions of petty and staff officers. The selection of the personnel which shall carry out successfully the work of the physical organization is a problem demanding more than skill in engineering and accounting. Success in administration demands a knowledge of men and of economic and sociologic questions. Successful officers possess this knowledge. They have gained it as a rule wholly by contact with men and with economic problems, oftentimes quite unconscious of the fact that they had acquired knowledge in a field which has so prolific and theoretic a literature. The attitude of disdain towards this literature is, however, gradually giving way to one of investigation. One reason for this is that students of economics are beginning to realize that they must investigate the influence of science upon industry. In discussing industry economists talk less today of political economy and more of just simple economics. They are beginning to realize that tariffs and international laws have less to do with national wealth than scientific methods of production and organization.

It must be acknowledged that successful commercial establishments exist whose administrative officers know very little about what they choose to call the practical part of the business. Their success, where it has not been due to natural location and priority in the field, is usually dependent on their good judgment in happy selection of lower officials and the turning over of the entire internal management to these lower officials who were equipped with proper training for scientific conduct of the factory.

Here again the old problem of the general advantages of education presents itself. A man without education has been successful. With an education the same man would probably have been more successful. A great general has won distinction in the art of war, having but a meager knowledge of tactics and of military equipment. With a well-rounded education he might have been still greater. The really great captains of industry of the future will be men trained not only in the art of salesmanship, but those who have made a scientific study of the problems of production, organization and administration as well.

President Shields, of the Consolidated Lake Superior Co., has been in New York arranging for the reorganization of the company. In an interview he said that the work on the construction of the Algoma Central will be resumed at an early date. He stated that the rail mill and blast furnaces will be ready for operation as soon as navigation opens. The wood working plants are in operation.

At a meeting of traffic agents of coal carrying roads entering the Pittsburg district, held at Pittsburg last week, it was decided that no reduction will be granted the coal operators in coal tariffs to lower lake ports this year. This is the second meeting of the traffic association and the second time that the operators have met with a refusal.

Twenty-six of the creditors of the Milwaukee Tack Co., Milwaukee, Wis., representing an aggregate of $14,506 of the $19,767 approved claims, have accepted the compromise of 25 cents on the dollar made by the bankrupt concern.

PATTERN COSTS.

BY R. W. MACDOWELL.

In most small pattern shops considerable trouble is experienced in accurately finding the cost of patterns. Of course a record can be made of the labor for any given time, usually a month, and an estimate made of the material used, but from this the real cost of the patterns made during that time can not be obtained, for much labor and material is usually expended in making repairs either on patterns or flasks or to the plant itself. First, if all of this is charged to the pattern account a false asset is shown and if this goes on from month to month there will be a serious discrepancy between the resources shown on the ledger and those actually existing. Second, this way of figuring gives no record whatever of the cost of each separate pattern. It is necessary to know the cost of each pattern, both for stock and for labor, not only in the case of patterns made for the shop, but for those made for outside parties. In many places, when an outside customer comes in to have a pattern made the decision is made, "We will charge so-and-so $28 for the pattern on his order," without having any actual idea of what the pattern actually cost. Twenty-eight dollars may be a good guess, but it is far more likely to be a poor one and either be so low as to fall below the actual cost of the pattern, thus cutting down profits on the order, or, as is common in many cases, it may be so high as to seem exorbitant to the customer. In such a case as this you may feel fairly sure that the customer will look for another place to have his next pattern made.

It is not a difficult matter to keep accurate costs of patterns, providing a proper system is devised and strictly adhered to. A system that is run loosely and deviated from to fit circumstances is worse than no system at all as it will be depended upon just as though it were being carried out properly and hence will prove very misleading.

Taking for example the case of a pattern shop employing six men making patterns for use in their own foundry and also for outside customers. Of these six men, four are pat-

REPORT OF LUMBER USED IN PATTERN SHOP ON Jan 15

I have to-day used the following Lumber: —

No. Pcs.	Kind	Size	Lin. Feet	Feet	Total Feet	C. Order	S. Order	This space for office use. Price	Total	Ck.	Charge To
2	Pine	12"x12"x1"			24		418	40 00	96		P. & Fd.
1	"	5"x12"x1"		5		516	394	"			516
1	"	3"x6"x4"		6	11	"	"	"	44		"
8	Hemlock	8'x4"x2"		42⅔			420				Repair
8	"	8'x4"x2"		42⅔	85⅓		"	20 00	1 71		"
4	Pine	4"x16"x1"		21⅓		611	399				P. & Fd.
4	"	8'x16"x1"		42⅔		"	"				"
2		4'x12"x4"		10⅔	74⅔	"	"	35 00	2 60	119	"
					195				5 71		

J. Lindsey Foreman

FIG. 1.

SUPPLIES USED IN PATTERN SHOP FOR WEEK ENDING Jan 23 1904

	Stores	P. Shop	Order	Amount	Ck.
Glue ½ lbs. @ 26	13				
Shellac 8 lbs. @ .33	2 64				
Pre. Shellac lbs. @					
Alcohol 1 gal. @	65		394	2 19	
Wax ¼ lbs. @ 8	62		399	2 38	119
Fillet 52 ft. @ .01¾	99		418	55	
Nails 4 lbs. @ 3		12	420	12	
" 3 lbs. @ 3		09			
" lbs. @					
Brads 2 bxs. @ 20		40			
Sandpaper 8 Sheets @ 2½		20			
Incidentals					
Total	4 43	81		5 24	

J. Lindsey Foreman

FIG. 2.

ternmakers and two are carpenters. The same system could be applied to a larger number of men, but for the sake of convenience in illustration the forms are filled in for this small number. The foreman can easily keep track of the time of the various men on each order by exercising a little care and using the forms here shown. Whatever method is used for general time keeping can be carried out in the usual way, the foreman's report serving as a check.

REPORT OF LABOR IN PATTERN SHOP Jan. 15. 1904

No.	Name	Order No.	From	To	Time	Total	Rate	Cost	Total	Ck.
19	McNeelis	418	7:00	5:30	10		3 50	3 50		
84	Hemphill	418	7:00	12:00	5		2 00	1 00	4 50	
	"	394	12:30	5:30	5			1 50		
29	Bower	394	7:00	5:30	10		3 50	3 50		
46	Padden	394	7:00	4:00	8½		3 50	2 98	7 48	
		399	4:00	5:30	1½			52		
10	Williams	399	7:00	5:30	10		4 00	4 00	4 52	
47	Benson	420	7:00	11:00	4		2 00	80	80	
									17 30	

FIG. 3.

Heavy Stores.

The shop itself should be kept solely for the work room and not for a store house. Heavy stores and supplies should be kept in a separate room large enough to contain the necessary kinds of lumber in different piles or racks and should, if possible, open into the pattern shop proper. It should be kept locked, the key in the possession of the foreman, who is required to see that all lumber taken therefrom is strictly accounted for. The amount of lumber required for a pattern or order of patterns should be carefully estimated and just this amount taken out and charged to the order. If more is required as the work progresses it can be gotten and another report made. These reports should be made out in such a manner as to provide a copy for the storekeeper and entered in his records.

SHOP ORDER

Date Jan. 13 1904 Job No. 399

To J. Lindsey Foreman Make the following:

1 Base Plate Pattern #G119
1 Bed " " #G120
For order #611
Both from Tracing #519

This order to be returned to office when work is fully completed. J. F. Mahlin Supt.

Date Completed Jan 20 1904 Signed J. Lindsey Foreman

FIG. 4.

Sundry Supplies.

Such material as glue, shellac, fillets, etc., should be gotten on requisition from the storekeeper at certain periods, and a record kept of the quantity used during this period. Nails, sandpaper, pattern letters and similar articles can be kept in the pattern shop and should be checked regularly and charged to the pattern account. In the main books a certain percentage of this amount is added to the cost of each order, the amount depending upon the proportion which the order bears to the total amount of the orders completed during that period.

One man in the shop should do all repair work and all supplies issued to him should be charged to repair account. Flasks made to replace wornout or destroyed stock should also be made by this man and charged to the repair account.

Material Reports.

Form 1 shows foreman's material report. This is not necessarily made out each day, as it is only necessary when lumber is issued. Each time that lumber is taken from the store room or sheds, the foreman notes the quantity, quality, kind, etc., on the report which he turns in to the office in the evening. Form 2 shows the report for the other supplies used, and is handed in once a week.

Time Keeping.

It is necessary to have a card system of keeping track of the time on each pattern, as this is the main item in its cost.

Bed Plate, Base Plate, End Brace

Date Aug 5. 03 Case No. 2 Sec. No. 2

Drawing Tracing Blue Print Drawer No. 8 Drawing No. 519

Scale Size Casting No.

Date 1903	Customer Order No.	Our Order No.	Remarks
8/8	1319	429	36 End Braces
11/29	1507		36 " "
1904 1/13	1686	611	40 Base Plates
"	"	"	40 Bed Plates

FIG. 5.

For this purpose when a man is assigned to a job he should not under any circumstance be shifted to another job until he finishes the one to which he was first assigned. To keep track of the work on each job, Form 3 is made out each day by the foreman. Every man has two extra lines left under his name so that there may be plenty of room in case he works on more than one job during the day. The cost column is for the work of each man while the whole amount of labor

on each job for the day is entered in the total column. These columns can all be proved by figuring the total time and comparing it with the sum of the time in the other columns. When a job is completed its shop order is returned with this sheet and the foreman makes a circle around the number of the completed order to call attention to this fact.

Time recording machines such as are in use in many up-to-date shops would be found very useful in connection with the work of time keeping. One advantage of these is that

REQUISITION SLIP

For J Lindsey Storekeeper Date Jan 15th

Required For Patterns Job No. 399

Draw material for one order only on this slip J Lindsey Foreman

FIG. 6.

they furnish an accurate statement of time. It is not intended that the foreman's report should be so constructed that the amount due each patternmaker can be figured from it, but it is intended simply as a means for determining the cost of each pattern.

Working of the System.

The cost records proper can be made out in any form which is desirable. This depends altogether upon the nature of the business and the individual preference of the management. Books, cards, loose sheets or lists could all be used in different ways according to the requirements. The writer's personal preference is for the card system and a card form is shown which does away with the cost sheet, all material and labor being summed up on this form as the work progresses.

To illustrate the system more clearly shop order No. 399 is carried through the different cards. This order is for a bed and base plate pattern. The castings on this order are made to fit together and hence the cost of the patterns is always figured together as the patterns must be made in pairs. The order form may be in any convenient style. Form 4 is given

G 119 126

Pattern Base and Bed Plate Order No. 399

From Drawing No. 519 No. Pcs. 2 Material Wood.

Date 1904		Material		Labor		Total		Location
Jan.	15	2	60					
	15			4	62			Room 1
	16							
	18			7	50			Side a
	19			7	50			
	19	2	38					Shelf 4
								Section 18
				19	52			
		4	98	4	98	24	50	

FIG. 7.

as an illustration. This may be charged in duplicate, the original going to the foreman, while the carbon copy is filed according to its number in the office, until the original returns from the pattern shops, when it is filed in a drawer for finished orders.

When the foreman of the pattern shop is ready to start work on an order he turns to his index, Form 5, and locates his tracings. The tracings should be kept in wide shallow drawers, so that they can be located easily when wanted. These drawers all bear numbers and are divided into sections which are also numbered so that reference to any drawer can be made readily. Whenever the office receives drawings or contracts they make out a card as shown and send both drawings and card to the pattern shop where the foreman files the former where he wishes, making a note on the card of the location.

Having found the required tracings he lays out the work, assigns the proper number of men to the job and issues lumber and other supplies and material required. Requisitions for this material may be on a form like Form 6. As the work progresses from day to day and the reports come in they are entered on the pattern record Form 7. The lumber is issued as shown in the illustration from the foreman's report. The sundry supplies from the weekly report and the lumber from the daily report. The cost of miscellaneous supplies on each order is obtained by taking the percentage of the total expense for miscellaneous supplies corresponding to the proportion which the order on hand bears to the total amount of work completed during that period.

The majority of material of this kind can be closely calculated and the remainder can be estimated very easily. As everything is reported it will only make a difference of a few cents one way or the other on any pattern and this difference will balance itself during the week so that the ledger account will correspond with the patterns on hand.

This system furnishes the management with some information to use in figuring the value of the plant, as everything of material consequence is reported intelligently and not as a mere guess.

Variations in this system would of course have to be made to suit different lines of work, but if it is laid down as a law and strictly adhered to that no work shall be made without a written order and no supplies issued or labor expended without an immediate report being made of it, little trouble will be experienced in adapting these methods to almost any pattern shop.

At a meeting of the board of directors of the Chamber of Commerce, of El Paso, Tex., a resolution endorsing the establishment of a plant by the Miners' Foundry & Machine Product Mfg. Co., was rejected on the ground that the proposed foundry would conflict with the business of other concerns already established.

The 19th annual meeting of the Stove Founders' National Defense Association will be held at the Waldorf-Astoria, New York, Tuesday, May 10. President Castle urges the attendance of every member, as matters of special importance will be considered.

The following officers of the Farmers' Co-operative Harvesting Machine Co. nave been elected: O. A. Bradfute, president, Xenia, O.; S. H. Ellis, vice president, Waynesville, O.; A. W. Grant, treasurer, Springfield, O. Directors: William N. Whitely, R. L. Holman, S. H. Ellis, O. E. Bradfute, C. F. Jackson, A. W. Grant, J. J. Hoppes, Lewis Laybourne and William N. Whitely Jr. Executive committee: William N. Whitely, R. L. Holman, A. W. Grant, J. J. Hoppes and William N. Whitely Jr. The stock is being offered to farmers at $25 per share. A discount of 10 percent on machinery will be given to all farmers who are shareholders.

Oatman Bros., Medina, O., manufacturers of Oatmans' adjustable eavestrough hangers and handy hoops, have been temporarily discommoded by the fire in their plant, but they expect to begin filling orders in two or three weeks.

The Mark Mfg. Co. has announced that its tube works at Zanesville, O., recently purchased, will soon be placed in operation. A rumor has been circulated that the company will erect and operate a skelp mill in connection with the tube plant, but this has not been confirmed.

The American Radiator Co. has made repairs to its St. Louis plant and resumed operations on May 2. There will be no new equipment required.

THE IRON TRADE REVIEW

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MAY 5, 1904

THE TIN PLATE WAGE REBATE.

The continuance of the famous tin plate rebate arrangement made in October, 1902, will come in for a great deal of discussion at the convention of the Amalgamated Association which opened in Cleveland this week. A large contingent is strongly in favor of discontinuing the agreement with the end of the scale year because of the general tin plate wage reduction granted last month. The 25 percent wage concession on rebate plates being deducted from the general wage scale as just reduced 18 percent requires the men to work for 61½ per cent of the wages they have been receiving, with but slight modifications, since the advance of July 1, 1899. This seems to be a bitter pill. It would appear plain that the arrangement is a good one for the men, since in the time they lose when tin mills are idle they either do nothing or accept work which pays them ordinary laboringmen's wages or little better. Such earnings look small in comparison with those of the regular tin mill worker, but it must be remembered that a larger number of regular Amalgamated men are working as helpers and as such do not get very much more than laboring men's pay, yet they have the same vote in association councils as the man who steadily holds a roller's or heater's job.

A study of the practical operation of the arrangement cannot be based on the exact figures, as reports of its workings are withheld from the public. It was entered into 18 months ago, and since then the American Sheet & Tin Plate Co. has made about 12,000,000 boxes of tin plate. An average of between one-third and one-fourth of the operative mills have been nonunion, and in these, of course, the arrangement does not apply. The collection of the 3 percent was suspended from June 1 to October 1, 1903, which cuts out four busy months. It can be assumed, roughly, that the collection has been made on about 8,000,000 boxes of tin plate to date, and 3 percent on all the tin plate pays a 25 percent wage rebate on 3-25ths, or say 1,000,000 boxes. This is approximately the amount of tin plate which the leading interest has sold to customers who pay the regular market price, but on the presentation of the proper documents receive from the company a rebate sufficient to make their plate as cheap as if they had bought it abroad, paid the duty of 1½ cents a pound, and subsequently had 99 percent of this duty refunded by the Government. In fact, the company has not come far from actually making this quantity for the rebate trade. As two years' time is allowed in which to present the claim for rebate, there is much plate out on which the demand will yet be made. The 3 percent contributions to the fund to date on 8,000,000 boxes would be between $130,000 and $140,000, and of this about $70,000 now stands in the fund. It is the existence of this sum of money, apparently idle, which has helped to disturb the men, although they can see in the association's report for the first quarter of this year an entry of $1,194.38 received as interest on the fund.

The statistics of the Government rebates paid during the fiscal year ended June 30, 1903, are only now available. They do not themselves indicate any falling off in the movement of Welsh tin plate in this trade, as the drawback was paid during the year on only about two million pounds less than in the average of the four preceding years. However, the arrangement of the American mills was only made when the fiscal year was four months old, and important orders had already been placed abroad by American exporters. The quantity of tin plate on which the Government has paid drawback in each fiscal year has been as follows:

Year ended June 30.	Pounds.	Year ended June 30.	Pounds.
1884	97,415,089	1894	161,758,361
1885	127,125,903	1895	126,777,800
1886	136,539,316	1896	137,059,779
1887	123,203,627	1897	139,246,130
1888	108,271,542	1898	137,897,570
1889	166,087,740	1899	122,906,682
1890	150,112,007	1900	125,269,156
1891	149,599,649	1901	127,261,883
1892	119,928,083	1902	125,340,511
1893	128,863,227	1903	123,088,272

Thus there has been a drop in the last fiscal year of only 2,000,000 pounds from the average of the four previous years, but prior to 1899 nearly all years showed a much heavier movement, so the slight drop disclosed by the figures is not so significant.

As the Government allows the drawback, not simply on the amount of tin plate actually existing in the exported article, but on the amount of tin plate actually consumed, with minimum allowances for waste, an accurate estimate of the tin plate imports for ultimate domestic consumption can be made. Taking the "imports for consumption" and comparing them with the drawback allowances, the following results:

Fiscal Year Ended June 30	Excess Imports over Drawback	Excess Drawback over Imports
	Pounds	Pounds
1898	34,013,656	
1899		11,792,801
1900	17,329,441	
1901		6,800,739
1902	74,511,879	
1903		13,878,001
	125,854,976	32,471,541
	32,471,541	
Six years' imports for domestic consumption		93,383,435
Annual average		15,563,906

Obviously domestic stocks were drawn upon in 1903 and previous alternate years. This year they can hardly again be so drawn upon, and the forthcoming figures should show a drawback allowance on less than the

quantity imported. Imports for three-fourths of the year compare as follows:

Nine months ended March 31.	Pounds.
1904	83,322,045
1903	81,517,033
1902	159,497,413

The close approach of the figures for 1903 and 1904 indicate that drawback allowances in the current year will show a considerable decrease. It is probable, also, that the total demand for tin plate for exported products has increased.

In general it may be said that in, say, twelve months past the American Sheet & Tin Plate Co. has been executing rebate business at an annual rate of three-quarters of a million boxes. Rather than sell steel to Welsh tin plate makers, as has been done in the case of a large tonnage, the United States Steel Corporation will, with the recent wage reduction, be more anxious than ever that the special 25 percent wage rebate be continued, and a serious contest with the workers on this point is not improbable. The large stocks accumulated before the recent wage adjustment have not been swallowed up and the combine would have no particular reason to shrink from a contest that would close its union mills for a time.

IMPORTS AND EXPORTS FOR MARCH.

Brief mention was made in these columns last week of the increase in exports as shown by the report of the Department of Commerce for March. The principal increases were in steel rails and in billets, ingots, and blooms, the exports of the former being 17,873 tons against 8,465 tons in February of this year, while of the latter the exports were 36,908 tons against 26,205 tons in February. Of the steel rails, 1,386 tons went to Europe, 6,498 tons to Mexico and 8,047 to Asia and Oceania. In February, we sent 1,197 tons to Mexico, while in March of last year only 29 tons were sent. This increase may be attributed largely to the new tariff of Mexico which became effective April 1, making the duty on steel rails $10. An effort was made to deliver all orders before that date. The detailed exports of which the tonnage is reported are as follows:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	March		9 mos. end'g March.	
	1903.	1904.	1903.	1904.
Pig iron	1,532	3,954	14,580	27,037
Scrap	659	1,937	4 779	11,010
Bar iron	3,299	3,058	9.957	14,019
Wire rods	2,748	3,035	22,138	11,961
Steel bars (not wire rods)	913	1,093	10,728	11.066
Iron rails	7	584	54	1.324
Steel rails	415	17.873	20,184	57,862
Billets, ingots and blooms	157	36.908	1.986	85,090
Hoop, band and scroll iron	264	515	1.059	2,110
Iron sheets and plates	118	173	2,010	3,981
Steel sheets and plates	1,438	2,724	9,680	11,015
Tin plates, terne plates and taggers' tin	20	502	670	830
Structural material	1.939	1,843	24 744	21,814
Wire	10,158	11.327	70.167	81,373
Cut nails	554	638	5.009	7.494
Wire nails	2,236	2,962	19 993	24 678
Other nails, including tacks	147	204	1,805	1,801
Total	26,624	89,330	219,243	374,465

The exports of iron ore in March were 30 tons against 1,055 tons in March, 1903. The value of exports, excluding ore, but including machinery and other items of which the tonnage is not returned, was $10,663,720, as compared with $7,983,547 for March, 1903, and $8,761,257 for February, 1904. For the nine months, the values were: $78,519,338 for 1904, $70,905,720 for 1903 and $73,067,830 for 1902.

Imports show no change of special significance, although the increase in pig iron from 3,841 tons in February to 12,400 tons in March and of scrap from 316 tons to 2,498 tons is surprising. Comparing the nine months ending March, 1903, with nine months ending March, 1904, we have the following:

IMPORTS OF PIG IRON AND CRUDE STEEL—GROSS TONS.

	Pig Iron.		Steel.	
	1902-3	1903-4	1902-3	1903-4
July	62,166	38,046	37,167	33,083
August	79.447	40.475	39,027	20,380
September	82,196	16,414	27,726	13,530
October	67,204	18,704	32,036	10,343
November	100,400	18,765	41,077	6,580
December	118,373	14,719	26,230	1,425
January	110,679	10,812	38,691	1,860
February	45,187	3,841	20,151	1,514
March	59,628	12,400	31,464	1,146
Total	725,270	174,176	293,569	89,859

The total value of imports of iron and steel, excluding ore, but including a number of lines in which tonnage is not ascertainable, was $1,894,306 in March against $1,551,967 for February and $4,129,845 in March, 1903. The value for the nine months was: $21,338,520 in 1904, $38,688,835 in 1903, and $17,901,072 in 1902. Iron ore imports were 22,655 tons in March, 1904, against 55,900 in March of last year. The tonnage table of imports on articles named follows:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES—GROSS TONS.

	March		9 mos. ending March	
	1903.	1904.	1903.	1904.
Pig iron	59,628	12,400	725,270	174.176
Scrap	7,317	2,498	97.944	23,675
Bar iron	3,980	1,322	34.445	25.470
Iron and steel rails	17,880	1,135	92,889	33,729
Hoop, band or scroll	219	18	1,281	1,596
Steel ingots, slabs, billets or bars	31,464	1,146	293,569	89 859
Sheets and plates	320	610	5,828	9,598
Tin and terne plates	3 477	6,669	36,391	37,197
Wire rods	1,778	784	17.476	14,235
Wire and wire articles	450	513	2,489	4,015
Structural shapes*		1,770		12,697
Total	126,529	28,765	1,307,582	426,047

*Not reported separately prior to July 1, 1903.

U. S. Steel Corporation Directors' Meeting.

All the retiring officers of the United States Steel Corporation were re-elected at the regular monthly meeting of directors held in New York May 3. In the finance committee Henry Phipps succeeds Charles M. Schwab. Francis H. Peabody resigned as a director and Robert Winsor, of Kidder, Peabody & Co., of Boston, was elected his successor. Mr. Peabody, who is of the firm of Kidder, Peabody & Co., retired because of ill health. The by-laws of the corporation were amended by changing the dates of the regular monthly meetings from the first Tuesday of the month to the last Tuesday of the month. This change will enable the board to ascertain the exact figures for the preceding months before the quarterly meeting of the board. Heretofore figures for the various quarters gave estimated earnings for the last month of that period. The last preferred dividend action was on Tuesday, April 5. The next action will be on Tuesday, July 26, or three weeks later than it would be under the former practice.

Mr. Phipps, it will be remembered, became a director a few months ago on the resignation of John D. Rockefeller and was re-elected at the recent annual meeting. His appointment to the finance committee is regarded as strengthening Mr. Frick's position in the corporation.

I. C. Hirsch Iron, Steel & Rail Co., of Cincinnati, is reported to be negotiating for 5,000 tons of relaying rails to be shipped to Cincinnati and there made suitable for side track or for use on small roads. This company is a new concern, which has recently acquired a site at Cincinnati, and is therefore incorrectly referred to in some recent publications as formerly of St. Louis. The statement may have grown out of the fact that Mr. I. C. Hirsch formerly resided in St. Louis.

The Western Machinery Market.

OFFICE OF *The Iron Trade Review*
1115 MONADNOCK BLOCK, CHICAGO, May 3

There are indications from the tenor of reports received from machinery manufacturers, that the dullness which was so marked in the first three months of the year is now less marked. Makers of all kinds of mechanical equipment, with the possible exception of those engaged in the strictly machine tool line, report that not only were their sales heavier during April than in any preceding month this year, but that the volume of inquiries received in that month showed considerable improvement. The advent of warm weather, bringing with it the commencement of outdoor operations, is largely responsible for the revival that has sprung up. Enterprises calling for the consumption of iron and steel have brought work to the structural shops, and the latter, called upon for quick deliveries, have not hesitated to place orders for the punches and shears, etc., needed to complete their contracts on time. Foundries making architectural castings have also felt the starting of trade due to the opening of the building season, and the majority of these interests have secured ample work in the past month to last them well through the summer. Engine builders, both steam and gas, as well as manufacturers of electrical equipment for power plant purposes, have shared in the revival to no small degree. As one manufacturer of steam engines puts it, "the turning point appears to have come and we do not fear any lack of orders for the balance of the year."

In the machine tool trade disappointment over existing conditions is expressed. Whether the dullness here is due to the fact that during the flush times of eighteen months ago manufacturers over equipped their plants with new and modern tools in the expectation that the extraordinary conditions then existing would continue indefinitely, it is hard to say, although this excuse has been put forward by some dealers who are always in close touch with their trade. There is a fair demand for the smaller class of tools, which are generally bought for rounding out a shop's equipment or for filling in gaps in floor space, but in such tools as boring mills, heavy planers, lathes and drills, etc., there is little business. The railroads, which are probably the largest buyers of this class of equipment, are still pursuing the policy of economy instituted early last year. Few new shops are being constructed, and there is a dearth of those long lists of tools which were so frequent two years ago, for makers to bid on. This condition, of course, is only temporary. Machines will wear out and renewals and additions must be made, although no such demand is expected this year as had to be met in 1902 and 1903. As soon as the presidential outcome becomes certain and the labor unrest is settled for another year, it is generally expected that a great stimulus will come all along the line.

George Whiting Co., Chicago, manufacturer of punches, shears and bending rolls, advises us that while there is considerable inquiry for new machines, it is unable to determine from the hesitating attitude of buyers whether they are actually in the market for tools or are merely investigating prices. Its experience of the past two months in following up these inquiries leads to the statement that such orders as are placed are prompted either by the actual necessities of the shop in the fulfillment of contracts made for quick delivery or for the renewal of old and obsolete machines. This company has secured its share of the orders placed, and its shop has been kept busy right through the year. It finds collections good and in this fact sees hope, despite this being a presidential year, of further improvement. Among the orders recently taken are the following: From A. F. Wagner, Milwaukee, Wis., one single belt power punch, with 15-inch throat and structural jaw; Young Bros., Detroit, one single quick-acting punch, with 18-inch throat; S. Wilks Manufacturing Co., Chicago, one combined belt power riveter and punch, with 48-inch throat; Louis Heinman, Chicago, one double belt power punch, with 15-inch throat on each side, one side arranged as a punch with structural jaw and the other side as a shear with plain cross-cut shear attachment; Marshall & Huschart Machinery Co., for shipment to H. Weis Cornice Co., Kansas City, Mo., one single, belt power, geared punch, with 18-inch throat and plain jaw; Milwaukee Bridge Co., Milwaukee, one set bending rolls, 86 inches long between housings, machine being built for motor drive and all gearing arranged above floor line so machine can be moved to any part of shop desired; Webster Manufacturing Co., Chicago, one belt power, combined riveter and punch, with stake 48 inches long, also one belt power rotary shear 31-inch throat; Manitowoc Dry Dock Co., Manitowoc, Wis., one double geared punch, with 30-inch throats and structural jaws on both sides.

Joseph T. Ryerson & Son, Chicago, special agents in the sale of punches and shears, etc., state that present conditions point to a steady and increased demand for machinery during the coming season.

Whitman & Barnes Manufacturing Co., Chicago and West Pullman, Ill., is more than pleased with the outlook and the present condition of trade. The company informs us that there has been some falling off in its orders, but this was expected in a presidential year. From the good indications shown in the steadiness of the iron and steel markets, the company predicts that the year will be a successful one from a business standpoint.

American Machinery Co., Grand Rapids, Mich., though finding the demand for its products very satisfactory, says there is a disposition among buyers to "make haste slowly." "Not so very long ago there was a disposition born of the market conditions, when the need of a machine was realized, to order it at once and immediately follow the order with hurry-up messages until the tool was delivered. Today shipments are being made quite promptly, though buyers are somewhat disposed to await developments until the last moment before placing orders." The company reports that its trade during the past spring was greater than at any previous time in its history and that it never had so many good prospects for large orders as it has at the present time. It has increased the capacity of its plant in the past winter by the addition of new equipment, and but for the lack of room further new tools would be added.

Industrial Works, Bay City, Mich., manufacturers of cranes, etc., say they have received more inquiries in April than during the three preceding months this year. Business however is very quiet as compared with what it was in the same period of 1903.

Ransom Mfg. Co., Oshkosh, Wis., manufacturer of motor and belt driven grinders, reports that trade has been better in the past month than at any previous time this winter. During the last thirty days, it has succeeded in closing up a number of deals for motor driven grinders that have been pending for several months past.

Wm. Ganschow, 12-14 South Clinton street, Chicago, gear cutting and milling work, contemplates placing an order for two new lathes within a week or so. Owing to the large amount of business on his books, he has been compelled to add several new tools to his equipment, and though only recently having put in a new lathe and a key-seating machine, finds the need of two more lathes. Mr. Ganschow says if labor troubles can be avoided this year, he sees no reason why business during the balance of the year should not be as good, if not better, than it was in 1903.

Wilmarth & Morman Co., Grand Rapids, Mich., maker of drill grinders, writes us as follows: "The general slackness in machine tool trade as evidenced in the marketing of our own products, and as shown by considerable correspondence throughout the country, still continues. We see no strong evidence of any great improvement in this direction in the near future. However, we believe we are receiving our full share of business and as evidence of which we mention some of our shipments of New Yankee drill grinders during the past few days: Stokes & Smith, Philadelphia; Renim Specialty Co., Boston; J. E. Hurley, Washington, D. C.; B. & O'C. Co., Chicago; Vulcan Iron Works, Cairo, Ill.; Emerson Steam Pump Co., Alexandria, Va.; Cushing Bros. & Co., Calgary, Alberta; Albrecht & Heicht, Louisville, Ky., Canadian Bridge Co., Walkerville, Ont.; Parkersburg Machine Co., Parkersburg, W. Va.; Eagle Square Mfg. Co., So. Shaftsbury, Vt.; Singer Mfg. Co., Cairo, Ill.; Electro Dental Mfg. Co., Philadelphia, Pa.; Stewart & Bruckner, Nashville, Tenn.; Butte & Boston Consolidated Mining Co., Butte,

Mont.; Southern Pacific R. R. Co., El Paso, Tex.; F. Co., Montreal, Can.; King Iron Works, Buffalo; Grote Mfg. Co., Evansville, Ind.; nine machines to Great Britain, and seven to South Africa, including four electrically driven drill grinders.

Barnard & Leas Mfg. Co., Moline, Ill., reports that its business this year has been as good as, if not better than, in the same period of other years. It looks for a continued good demand throughout the balance of the year.

Davenport Locomotive Works, Davenport, Ia., builders of light locomotives, advise us that while domestic trade has fallen off considerably, this deficiency is more than offset by an excellent foreign business. Among the orders from abroad booked within the last six weeks, is one for four switching engines from the Cerro de Pasco Mining Co., Peru, South America. The company also has orders for shipment to Mexico and Spanish Honduras, and is negotiating for some business in South Africa.

Bignall & Keeler Mfg. Co., Edwardsville, Ill., manufacturer of pipe threading and cutting machines, states that its sales in the past month were not as good as in the same month of last year. Inquiries, however, have lately improved in volume and the company looks for a betterment of conditions during the balance of the year.

Williams, White & Co., Moline, Ill., inform us that generally speaking business is dull at the present time. The company recently closed a contract with the Chicago, Rock Island & Pacific railway, for the hoisting machinery and the patent coal chute fixtures for several coaling stations on the company's lines in Missouri.

Novelty Iron Works, Dubuque, Ia., have lately shipped several improved Boss power hammers to England, Canada, Mexico and Porto Rico. The foreign demand for this tool is gradually improving, the hammer being especially designed for export shipment in a knock-down condition, and the company expects to build up a good business abroad in it. An order has also been received from Mexico for Victor punches and shears, a line of tools which the company has recently placed on the market.

Crawford & McCrimmon Co., Brazil, Ind., builder of coal mining machinery, says that the outlook for business in its line is very bright and that it has a great many orders on hand.

National Machine Co., Milwaukee, Wis. manufacturer of speed lathes, advises us that the demand for machine tools is quiet. It says, however, that inquiries have been freer in the last two weeks, which it takes as an indication of better conditions in the near future.

The Dings Electro-Magnetic Separator Co., Milwaukee, Wis., has been receiving some nice orders for brass and iron magnetic separators from Canada in spite of the 25 percent duty on machinery made in the United States. The foundry trade in the United States, however, is quiet.

Northern Electrical Mfg. Co., Madison, Wis., reports that collections are good and that its business maintains a fair volume, though quieter than a year ago.

The Mechanical Appliance Co., Milwaukee, Wis., builder of motors and generators, writes us as follows: "We beg to state that since the first of the year and up to the first of April, we have found business very slow We were quite busy during the month of January, mostly, however, on unfinished orders which were held over from the previous year. February was the poorest month that we have had in a considerable period. During March, conditions brightened up a little and that month might be considered a fair to moderate one. Since the first of April, business has picked up very materially, and according to present indications, in point of sales, this month is going to be one of the best in the history of our business. Conditions also seem to indicate that the coming month will be equally good; in fact, it is seldom that we have had as much future business in sight as at the present time. Referring to the slump along the first of the year, our experience was that it was something entirely apart from the question of price. We do not believe that a reduction in prices would have brought any more business than we secured by holding steady to same. It seemed rather a disinclination to do business at any price. We have taken no notable orders during the past month, our trade in this period being made up of a steady influx of small business, which was more satisfactory to us than if the orders had been of a spectacular nature."

TERMS OF THE CLAIRTON STEEL CO. TRANSFER.

The properties of the Clairton Steel Co. of Pittsburg, whose entire stock issue of $3,500,000 was owned by the Crucible Steel Co. of America, was purchased by the United States Steel Corporation last week, the property being paid for by the guarantee of the United States Steel Corporation of securities heretofore issued by the Clairton companies, aggregating a little less than $13,000,000, and the delivery to the Crucible Steel Co. of America of United States Steel Corporation 10 60-year 5 percent sinking fund gold bonds of the par value of $1,000,000. The market value of these bonds at the time the deal was closed was $767,500. In addition to the properties, there is included in the purchase, cash, notes, bills receivable and other assets to the value of $2,619,000. The Crucible Steel Co. of America is guaranteed a supply of pig iron and steel for a period of 10 years by this deal, the prices of which are to be adjusted on a sliding scale. Regarding the purchase, E. H. Gary, chairman of the board of the directors of the United States Steel Corporation, made the following statement:

The United States Steel Corporation has contracted with the Crucible Steel Co. for the purchase by the former of the properties controlled by the latter known as the Clairton Steel Co. properties. They consist of about 150 acres of land located on the Monongahela river between McKeesport and Donora, 17 miles from Pittsburg, on which there have been completed, and are now in operation, five blast furnaces, 12 open-hearth furnaces, one 40-inch blooming mill and one 28-inch billet mill, together with necessary shops, power plants, etc.; also 2,907 acres of good coking coal lands in Fayette county, Pa.; Champion Iron Co. properties on the Marquette range, including 20,000 acres in fee, and a large tonnage of ore already developed; one-half interest in the Clairton mine, the Little and Prindle iron mine, 51 percent of the stock of the St. Clair Limestone Co., about 14 acres adjoining the steel plant on which are located 140 dwelling houses; also the total capital stock of the St. Clair Terminal Railroad Co., which has built and owns a new double track steel bridge across the Monongahela river, and which railroad connects the manufacturing plant with trunk lines of railroads on both sides of the river. Also included in the purchase are cash, notes, bills receivable and inventory of the total guaranteed cash value of $2,619,000. The manufacturing plant is new, modern, just finished and first-class in every respect. The plant has a capacity of about 475,000 tons of pig iron per annum, and about 300,000 to 350,000 tons of billets and slabs per annum. The ingot capacity is about 400,000 tons per annum.

The property will be paid for by the guarantee of the United States Steel Corporation of securities heretofore issued by the Clairton companies, aggregating a little less than $13,000,000, and the delivery to the vendors of the United States Steel Corporation 10 60-year 5 percent sinking fund gold bonds of the par value of $1,000,000. The properties are acquired free and clear of all floating liabilities or indebtedness.

A contract has also been made with the Crucible Steel Co. whereby the latter will receive and take from subsidiary corporations of the United States Steel Corporation for a term of 10 years about 120,000 tons of steel per annum, and about 80,000 tons of pig iron per annum, on a sliding scale of prices.

Negotiations for the purchase and sale of these properties have been pending to a greater or less extent during the last year, but until the present time an agreement could not be reached. The property has been contracted for after a most critical and painstaking examination by the experts of the United States Steel Corporation and subsidiary companies, and has been secured at a price materially less than its cost to the Crucible Steel Co.; and as to the manufacturing properties, at a price much less than the same could be duplicated for at the present time.

Regarding the sale of the property, the officials of the Crucible Steel Co. of America made the following statement:

"The effect of the contract is to relieve the Crucible Steel Co. of America from meeting the rapidly maturing obligations of the Clairton Steel Co., which for the last 18 months have been absorbing the earnings of the company to the detriment of its financial credit and the injury of its stockholders; and while in making the contract the Crucible Steel Co. has made

a considerable sacrifice, the contract for the supply of its raw material places it in as good position in that regard as it was with the Clairton plant, and at the same time it is relieved from the heavy obligations of that company."

The statements of E. H. Gary and of the officials of the Crucible Steel Co. throw no light whatever on the floating indebtedness of the Clairton Steel Co., which has been variously reported, but concerning which no official figures have been given out. The bonded indebtedness of the Clairton Steel Co. amounted to $11,250,000, while the entire stock issue held by the Crucible Steel Co. of America amounted to $3,500,000. Other securities amounting to more than a million dollars are also guaranteed by the steel corporation. The only available proceeds which the Crucible Steel Co. of America receives from the deal are the bonds, the market value of which on the day the deal was closed was $767,500. It is doubtful if this is sufficient to wipe out the floating indebtedness of the company. Why the directors of the Crucible Steel Co. permitted the sale of the properties on these terms in view of the fact that assets amounting to over $2,500,000 were on hand is one of the questions which stockholders of the Crucible company are endeavoring to answer. It is conservatively estimated that by this deal the Crucible company loses between $3,800,000 and $4,000,000. It is an excellent one so far as the steel corporation is concerned, involving the outlay of only $1,000,000 in bonds which is more than twice made up by the quick assets. The intrinsic value of the properties and the price paid for them, as compared with the Union and Sharon properties, make the purchase one of the best since the formation of the corporation. However, it has loaded itself with new obligations, all of which must be provided for before the preferred dividends can be met. The ore properties secured are of course valuable, further strengthening the corporation in its supply of raw material from the Lake Superior region. The property of the Champion Iron Co. is desirable, but the other properties secured are of less importance.

OPENING OF THE ST. LOUIS EXPOSITION.

With perfect weather and all other conditions favorable, and with an attendance of 187,793 people, the Louisiana Purchase Exposition was opened April 30. President Roosevelt, by turning a golden key, closed the circuit on the wires stretching from the White House to the exposition grounds and started the machinery and cascades. The principal addresses were delivered by President D. R. Francis, Secretary of War Taft, Congressman Tawney, of Minnesota, and Hon. Thos. H. Carter, president of the national commission. All the speeches were eulogistic of the enterprise and energy of St. Louis, and there was unanimous consent from American and foreign representatives that the exposition is the biggest thing of its kind ever projected. Commissioner La Grave of Paris was extravagant enough to predict that it will prove the ne plus ultra. Inspiring as the scene when the exposition unfolded itself in the morning, the most gorgeous spectacle was saved for night, when the full power of the illuminating plant outlined the buildings and the cascade in lines of fire.

The latest views of the Palaces of Machinery and Electricity at the St. Louis Purchase Exposition are illustrated by the accompanying halftones. The Palace of Machinery is 600 x 1,300 feet and the Palace of Electricity is 525 x 730 feet. One of the noticeable features of the World's Fair is the cast iron statue of Vulcan brought from Birmingham, Ala. This statue weighs 100,000 pounds, is 56 feet high and will stand upon a pedestal of coal and coke in the Palace of Mines and Metallurgy as representative of the mineral resources of the Birmingham district. The figure was modeled by G. Moretti. The exhibit cost $20,000 and has required almost a year to complete it. The statue is made in fifteen pieces, the head being 7½ x 7 feet and weighing 15,000 pounds. Vulcan's hammer weighs 300 pounds and the weight of the anvil block is 6,000 pounds.

FIG. 1.—THE PALACE OF MACHINERY.

The plant and fixtures of the Standard Mfg. Co., Ltd., Galesburg, Mich., have been sold to Samuel Foster, Geo. Polasky, and D. O. Holden and incorporated as the Standard Windmill & Mfg. Co., under the laws of Michigan. The company will manufacture the Standard windmill and do a general line of foundry work.

It was announced May 3 at the Harrisburg, Pa., office of the Elliott & Hatch Book Typewriter Co. that definite plans have been made for consolidating the Harrisburg and Cleveland plants of the company this summer. The location of the combined factories will be either Cleveland or Harrisburg, no decision having yet been made as to the site.

Following the custom inaugurated at the time of the Chicago World's Fair and duplicated on the occasion of the Buffalo Exposition, the Kilbourne-Jacobs Mfg. Co., Columbus, O., will send its employes to the St. Louis Exposition on their annual outing.

A meeting of representatives of Ohio foundry pig iron interests was held in Cleveland, May 4, at which discussion of matters considered at the recent meetings in Columbus was continued. Among those present were: D. B. Meacham, of Rogers, Brown & Co.; D. T. Croxton, general manager of the Cleveland Furnace Co.; F. B. Richards, of M. A. Hanna & Co.; Harry W. Haggerty, of Corrigan, McKinney & Co.; Col. J. G. Battelle, of the Columbus Iron & Steel Co.; and I. C. Clutts, president of the Wellston Iron & Steel Co., Wellston.

Announcement is made that the United States Tube Works of Buffalo purchased in March at receivers' sale by George Timmins, has recently been disposed of to a syndicate which contemplates the utilization of the buildings and land for other purposes. It is said that there is no immediate prospect of a resumption of tube making.

The Eastern Machinery Market.

NEW YORK OFFICE OF *The Iron Trade Review*,
Room 1315, 150 Nassau Street, May 3.

The machinery situation in this locality during April was quiet. By way of comparison with March, various reports are given, some concerns saying business receded a little, while others, and they are in the majority, say it improved slightly. In the main, however, the month turned out to be a disappointment, and many good-sized orders that were expected to be given out, are still in abeyance. The one thing all machinery houses are pleased with is that inquiries keep on coming in pretty regularly even though they do not develop into orders as quickly as might be wished.

In machine tools there were no orders of any consequence placed, nearly all those booked being for one or two tools at a time, and forming a fairly good business in the aggregate.

While much was heard about railroads coming into the market for shop equipment, no orders of any magnitude are reported. In small orders at frequent intervals, railroads are in evidence, but in orders on a scale in keeping with what they are known to need, there is much to be desired. The demand from manufacturing sources for machine tools is fair. Everywhere expressions of approval are heard concerning the action of the National Machine Tool Builders' Association in reaffirming prices. The opinion here is strong that whatever disappointment may be felt because of poor business in machine tools, whether of present or future origin, it cannot be attributed to prices, so that any change in the latter, even though it were a substantial reduction, would not help things any. Prices are being well maintained, and if orders are being taken at concessions, nothing is heard concerning them.

In engines and boilers business for April was much better than in March. The quick way some propositions are taking hold is a surprise to the trade. Manufacturers are particularly good buyers, and the number of orders being received for engines ranging from 150 to 300 horsepower was greater during April than for any month since the present year opened. Manufacturers report an improving labor situation throughout the country, especially in the East, and to this they attribute the increase in their orders in a large measure. There are many orders for considerable horsepower held up pending definite data on turbines; at least that is the statement made by some manufacturers.

Electrical machinery men assert that business in their line for April was not as active as for March. Orders placed during the month were all for small equipment. Competition for such business as was going was very keen, and concessions are frequently reported. The General Electric Co. is now disposing of small equipment at a lower price than in years. It is only a short time ago when the company's price for a standard 30-h. p. motor was $422, but now it is $407. In trade circles the action of the company is said to be due to a desire to unload its surplus small equipment, of which it is reported to have considerable on hand. Electrical apparatus adapted for buildings of all kinds is beginning to look up. In big work the only thing of importance is the turbo-alternator sets that will be required for the new dry dock at the New York Navy Yard. The bids were opened in Washington a few days ago, and the only bidders were the General Electric and Westinghouse companies, whose bids were $47,447 and $54,000 respectively. The Government appropriation is $44,000. As showing how keen competition in the electrical line is, the bids opened a few days ago for the generating sets of the new battleship "Indiana," afforded some proof. The bids were as follows: Crocker-Wheeler Co., $20,379; Thresher Electric Co., $20,474, and the General Electric Co., $20,684.

The foreign machinery trade for April was without special interest. There was the usual sale of one or two items of machinery now and then, but monthly totals make a meager exhibit, with electrical manufacturers faring the best.

The orders for the machinery that will be required in connection with the Pennsylvania tunnel will not be given out for several weeks yet. The contractors are asking for some bids, but bids for the major portion of the machinery will not be called for for several weeks.

The Niles-Bement-Pond Co. found April a fair month, with small orders predominating. Secretary Davis of this company, who has been away from his desk for several months because of illness, and who looks after the railroad end of the business, is now on a business tour. H. B. Frevert, who has been in charge of the company's miscellaneous department, which is solely devoted to the machines of outside manufacturers, severed his connection with the company recently.

The Prentiss Tool & Supply Co. reports that the past month has been a fairly good one. It believes that the numerous inquiries received augur well for some excellent business later on.

FIG. 2.—THE FACADE OF THE PALACE OF ELECTRICITY.

The J. R. Vandyck Co., which represents many machine tool interests, noted a falling off in trade during April. One of the company's best orders was for a plain radial drill, a drill press, and medium size lathe from the Remington Arms Co., Ilion, N. Y. The latter purchased other machine tools also, the orders going to Brown & Sharpe Mfg. Co., and Hill-Clarke & Co.

J. J. McCabe reports that his lathe business has been quiet. He is receiving many inquiries, and expects to close some good contracts as a result of these.

The A. & F. Brown Co., manufacturer of power transmitting machinery, reports trade to be improving, especially during the past week. The improvement in the labor situation has been considerable to do with it. The company's factory is running on full time with occasional overtime.

Paul Bigelow, representing the Buckeye Engine Co., Salem, O., has taken many orders recently, the most important being the following: Three 300-h. p., five 100-h. p., and one 150-h. p. engines, from the Consolidated Gas Co.; six 470-h. p. engines for the new store of John Wanamaker, this city; one 150-h. p. engine, from Baer Bros., Stamford, Conn.; six special engines aggregating 300-h. p. from the Connersville Blower Co., Connersville, Ind.; one 120-h. p. engine, from the Amsterdam Supply Co., New York City; and one 250-h. p. engine, from A. G. Spalding, New York City.

The Crocker-Wheeler Co. reports that its trade for April fell off 20 percent from March. The business booked during the month was all for small equipment.

E. W. Ludeman, representing the Fitchburg Steam Engine Co., has received an order for two engines aggregating 500 h. p. from the New York Dressed Beef Co., New York City.

Hill, Clarke & Co. are satisfied with the business they did during April. It was nothing out of the ordinary, but was of the small and steady variety.

Thayer & Co., Inc., manufacturers of steam boilers, report that their trade for April was fairly good. They think business gives many indications of getting active.

The Lidgerwood Mfg. Co., builder of hoisting engines, had a fair month's business, but the officials of the company do not expect trade to show any particular activity in the next few months.

The Ingersoll-Sergeant Drill Co. noted no change in its line in April. The company reports that business holds up even better than expected.

The American Wood Working Machinery Co. reports trade satisfactory. It had a steady run of small orders which make up a good monthly total.

General Electric Co.'s Report.

The annual report of the General Electric Co. for the year ending Jan. 31 shows that profits were $7,865,377, as compared with $10,277,169 in the preceding year. Commenting on the results of the year the report says:

"The disturbed financial and other unsatisfactory conditions of the past year have considerably affected your business, and the percentage of profit upon business done is smaller than for the previous year; the increased price of copper, higher priced and less effective labor, large expenses in developing steam turbines, and lower selling prices have all contributed to this result."

On some new features of the business the report has the following to say: "The New York Central & Hudson River Railroad Co. has placed with us an order for 30 electric locomotives, which will be used in hauling all trains on that portion of the main line within a radius of 34 miles of the Grand Central station. Each of these locomotives will have a capacity of about 2,500 h. p.; they are the largest ever developed for steam or electrical work, and are of an original and unique design produced by our engineers. We believe this order is the forerunner of many others to be placed by steam railroads. The past year has been marked by the successful introduction of the Curtis steam turbine. We made an arrangement with the inventor of this turbine a number of years ago, and as a result of his work and of our engineers a type of prime mover has been developed especially adapted for driving electrical generators. The combination of turbine and dynamo is known as a 'turbo-generator,' is unusually simple, efficient and of low cost. A large line of turbo-generators, varying in size from 1½ h. p. to 7,500 h. p., has been developed. We have sold about 350,000 h. p., of which 35,000 h. p. have been installed and are in successful operation. It is believed that the low cost, simplicity, small space and many other advantages of the Curtis turbine will result in a greatly increased sale of electrical apparatus."

Jacob S. Coxey, representing the Coxey Steel & Silica Sand Co., has evolved a rather novel plan of issuing bonds. He proposes to issue $500,000 first mortgage, 6 percent gold bonds on the plants of the company, due in 1964. He agrees to deposit with the Union Savings Bank & Trust Co., of Cincinnati, $22.53 on each $100 bond sold, which it is to carry for 60 years at 2½ percent interest. This deposit will pay the face value of the bond at maturity.

The Labor Situation.

CONVENTION OF THE AMALGAMATED ASSOCIATION.

The annual national convention of the Amalgamated Association of Iron, Steel and Tin Workers opened at Cleveland on Tuesday, May 3. President T. J. Shaffer delivered his annual address at the opening session, which was followed by reports from the other officers. Later in the week the discussions of changes suggested in existing scales will take place, but it is not expected that any of the scales will be acted upon finally in less than 10 days.

The program containing the printed suggestions for changes in the scale made by the various lodges contains 228 suggestions, as compared with 309 one year ago. The changes desired are as follows: Constitution, 85; memorandum of agreement, 4; boiling scale, 22; muck and puddle mille, 13; piles on boards, 4; busheling on sand bottom, 12; bar and 12-inch mills, 6; prices for mills making a specialty of working pipe or skelp from iron or steel, 2; guide, 10-inch, hoop and cotton tie mills, 18; sheet and tin bar scales, 4; melting house scale, 1; special scales, 4; miscellaneous suggestions, 6. In referring to the convention the officials of the association in the current issue of their journal make the following statement:

"The program of business indicates that many of the lodges realize that the time has come to make some changes in the policy of the organization. The suggestions offered, if put into practice, mean complete reorganization of the association. This shows the importance of the work that confronts the members of the coming convention. They will be called upon to legislate to make the organization stronger fraternally, beneficially, and as a result numerically, than it now is."

The program was prefaced by an address from President Shaffer, in which he said among other things: "As required by law, we have received and arranged the various suggestions forwarded to us by sub-lodges, and the same are now placed before you for inspection and calm consideration. The matter here submitted to you is of the most important character. We ought to approach the consideration of these suggestions with a full sense of what results may be the outgrowth of our action. Perhaps no greater or more sacred duty can be placed in our care than that of guarding the interests of our wage-earning associates, and that duty is never better performed than when he to whom it is given makes careful investigation into conditions, divests himself of contracted inclinations and moved only when the common good will be served, counsels the adaptation of our course to the requirements of the times."

The address of welcome was delivered by Rev. H. R. Cooley, member of the board of public service, of Cleveland, who represented Mayor Johnson. In his response, President Shaffer said in part: "We come into this convention without rancor, class jealousy, and distinctions of wealth and rank. We come with peace in our hearts for all. This association is not a union that believes in the strike as an instrument for the settlement of disputes between employer and laborer. It has always been foremost among those organizations that believe in the strike only when encroachments upon their rights are too rapid and too great to be met by any other means."

PITTSBURG EMPLOYERS' DECLARATION OF PRINCIPLES.

The Master Builders' Association of Pittsburg last week adopted the following platform which became effective on Monday, May 2:

Resolved, That the following eight cardinal principles will form the basis of all dealings with our employes:

That there shall be no limitation as to the amount of work a man shall perform during his working hours.

That there shall be no restriction of the use of machinery or tools.

That there shall be no restriction of the use of any manufactured material, except prison made.

That no person shall have the right to interfere with the workmen during working hours.

That the use of apprentices shall not be prohibited.

That the foreman shall be the agent of the employer.

That all workmen are at liberty to work for whomsoever they see fit.

That all employers are at liberty to employ and discharge whomsoever they see fit.

STRIKE ON THE SANTA FE RAILROAD.

Over 800 machinists and a large number of allied workers on the Atchison, Topeka & Santa Fe railroad were reported out on a strike up to 5 o'clock of the afternoon of May 2. When the whole striking strength is brought out, embracing not only the machinists, but the Allied Metal Mechanics' Association, boiler makers, blacksmitns, copper workers, helpers, etc., as well, the total number involved, according to President O'Connell, of the machinists' union, may approximate between 10,000 and 12,000 men. As fully explained in *The Iron Trade Review* of April 14, in which the statement of Third Vice President Kendrick of the Santa Fe was published, the company insists upon the open shop.

When the 2,000 machinists and workmen gathered at the big railway shops of the Atchison, Topeka & Santa Fe road in Topeka, May 2, they found the gates locked. The Santa Fe officials say they simply anticipated a strike.

METAL TRADES ASSOCIATION NOTES.

The attorneys employed by the commissioner of the N. M. T. A. to investigate the laws of the several States relative to the amendments to Article 9 of the constitution and by-laws are busily engaged in this work.

The brass manufacturers of Chicago express satisfaction over the success of their contention for the open shop.

The St. Louis Metal Trades Association is considering the question of local agreements.

The committee on agreements of the Chicago Metal Trades Association is holding daily sessions.

There will be a general meeting of the Manufacturers' Association of Pittsburg, of which George M. Cooper is secretary, shortly after the middle of May, at the call of the president of the Association.

The secretary of the Chicago Metal Trades Association announces the following summary for the week ending April 28 of the labor bureau which was started there three weeks ago: Total registration of employment wanted, 262; total calls for help, 49; total men reported employed, 26.

Secretary Robert Wuest of the N. M. T. A. visited St. Louis, Chicago and several Illinois points last week in the interest of the association.

From all reports being received it would appear that the question of the open shop is now being pushed prominently to the front by machinery manufacturers.

The administrative council of the N. M. T. A. is arranging for a meeting at the commissioner's office, Cincinnati, in the latter part of the month.

LABOR NOTES.

Six hundred mechanics on the Norfolk & Western shops at Portsmouth, O., have gone on a strike. The company states that no inconvenience will be suffered as new men are being employed to take the places of the strikers.

By granting a 9-hour day to machinists in its employ, the New York & New Haven railroad prevented a strike which had been threatened. The increase of wages asked by the men has been refused.

An unsuccessful effort has been made to settle by arbitration the strike of about 3,000 employes of the Fore River Ship & Engine Co., Quincy, Mass.

Because the proprietor of the National Rolling Mills at Vincennes, Ind., refused to advance the wages of 200 laborers from 13½c to 15c an hour, a strike was inaugurated, but was ended by compromise in a few days.

A referendum vote is being taken on the terms of the proposed agreement to be entered into between the Chicago Metal Trades Association and the International Association of Machinists.

The iron molders of Columbus, O., will demand a higher scale when the present agreement expires June 1.

At the plant of the Rochester Barrel Machine Co., Rochester, N. Y., 23 machinists went on strike because a new lathe had been purchased from a company which is on the "unfair" list of the union. The strike was soon settled, it being understood that the men will not be required to operate the objectionable lathe, an apprentice being hired for that purpose.

The foundry owners and the iron molders of Minneapolis and St. Paul are verging on a deadlock over an agreement for the coming year. The Minneapolis union has submitted the old agreement to the employers who decline to accept it in its entirety.

Chicago manufacturers are preparing to test the statute which makes it unlawful for employers to engage men to work in time of a strike without informing them that a strike exists. The Illinois Manufacturers' Association and the Chicago Metal Trades Association are both interested in the testing of the constitutionality of the law.

The Allen Mfg. Co., Nashville, Tenn., which had heretofore manufactured stoves and ranges, has notified the molders employed at its works that it will discontinue the manufacture of stoves and make only range castings, and that it is unable to pay the present price for molding these castings. The molders have declined to accept a reduction and the plant is now closed.

Miners at the Chandler and Pioneer mines at Ely, Minn., have gone on a strike, giving as their reason dislike for the superintendent of the mines. The latter has left the mines and they are shut down for an indefinite period.

By order of the directors, the Norway Iron & Steel Co.'s plant at York, Pa., has been closed down. All the stock on hand has been shipped and about 150 men thrown out of employment. The suspension is due to a strike of molders which has been in progress about two weeks.

The machinists of the William Tod Co. and the Lloyd Booth Co., Youngstown, O., have been notified of a reduction of 5 percent in their wages beginning May 1. One hundred men are affected. The men went to work May 2 under protest, and will await the action of the international union before striking.

The American Production Co. of Reynoldsville, Pa., has applied for a Pennsylvania charter with $300,000 capital. The new concern will take over the plant of Charles McSherry at Pittsburg, Pa., and as soon as the Reynoldsville plant is under way the machinery in the Pittsburg plant will be removed. Charles McSherry is president and general manager; George M. McDonald, secretary, and C. F. Hoffman, treasurer. A site of 10 acres has been secured upon which three buildings will be erected. The foundry will be 75 x 100 feet, machine shop 65 x 300 feet, and office building 24 x 40 feet. Brass, steel and iron castings will be manufactured, while the sheet metal trade of the Pittsburg concern will be continued. Labor saving tools for sheet metal workers will also be manufactured. The buildings will be of steel construction and will be equipped with modern machinery and labor saving devices.

The annual meeting of the Jones & Laughlin Steel Co., Pittsburg, was held last week. Geo. M. Laughlin Jr. and F. L. Garlinghouse were elected to the board of directors to fill the vacancies caused by the death of the late B. F. Jones and the resignation of I. B. Laughlin, who has gone to Japan as an American consul. All the old officers were re-elected as follows: B. F. Jones Jr., president; Willis L. King, vice president; J. B. Laughlin, treasurer; T. K. Laughlin, assistant treasurer; and W. C. Moreland, secretary. W. L. Jones continues as general manager. The board of directors is now constituted as follows: B. F. Jones Jr., Willis L. King, Henry A. Laughlin, G. M. Laughlin, James Laughlin, W. L. Jones, T. O'Connor Jones, J. B. Laughlin, W. C. Moreland, Roland Gerry, W. W. Willock, H. S. Kiehl, Robert Geddes, G. M. Laughlin Jr., and F. L. Garlinghouse.

Chas. B. Barnes, of Hingham, Mass., and Chas. H. Allen, of Newton, Mass., have been appointed receivers of the Boston Steel & Iron Co. on petition by the Cambria Steel Co. of Philadelphia. The total indebtedness approximates $146,000, of which $90,000 is unsecured.

The Mark Mfg. Co. has announced that its tube works at Zanesville, O., recently purchased, will be placed in operation by May 15. A rumor has been circulated that the company will erect and operate a skelp mill in connection with the tube plant, but the company advises us that this is erroneous.

MELTING FURNACE USING COMPRESSED AIR.

The Steele-Harvey metal melting and refining furnace is used in connection with compressed air and fuel oil or natural gas. It is manufactured by the Monarch Engineering & Mfg. Co., of Baltimore, Md. The invention includes a furnace,

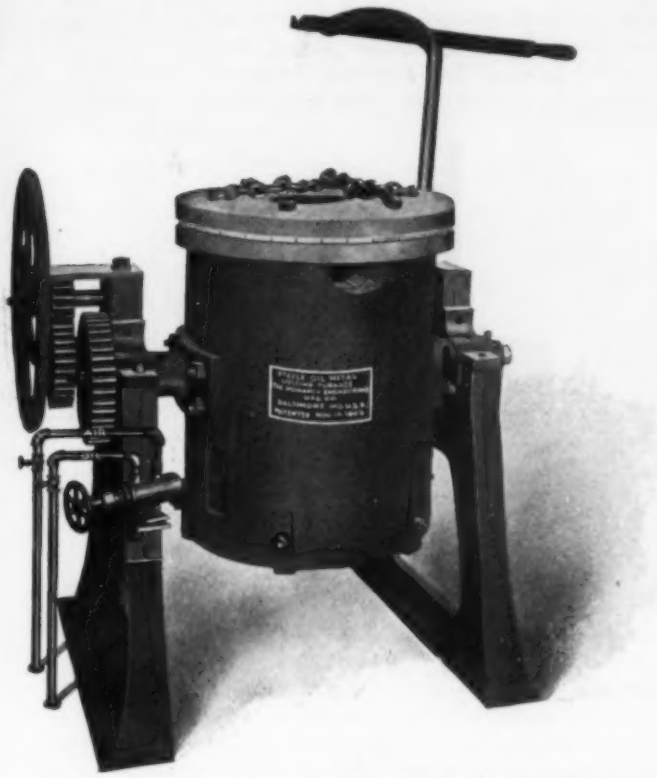


FIG. 1.—THE STEELE-HARVEY FURNACE IN MELTING POSITION.

comprising an outer steel shell firmly riveted and lined bottom and sides with a double row of fire-brick and an air space between the inner wall of the fire-brick lining and the crucible. The crucible rests at the bottom on a square graphite block, against which the flame plays and circulates entirely around the crucible, the improved lid preventing the escape of objectionable vapors and gases. The furnace is shown in the melting position in Fig. 1, and Fig. 2 illustrates it with lid lifted and in pouring position.

The furnace is swung between two upright trunnions, is tilted and is always under control of the operator by a mechanical device operated by gear wheels and connections, which enables the operator to swing it at any angle and placed in a pouring position within his full view and control. The furnace being entirely above ground, there is no waste of metal. The burner is operated with both oil and air and is under control at all times by the main piston valve having a needle point at the extreme oil outlet, thereby giving the burner the advantage of a vaporizing effect and freer circulation of oil and air. The crucible is always retained within the furnace, thereby losing no heat in pouring off, and is secured in position by wedge-shaped fire-brick, and is never taken out, thereby extending the life of the crucible.

The furnace occupies a floor space about 3 feet 6 inches by 4 feet 6 inches, and is placed in the general foundry. It is made to contain Nos. 40, 60, 125 and 275 crucibles. The makers furnish a special large lip crucible with each order. The furnace in shipping order will include crucible, burner, fire-brick, and will weigh from 1,700 to 2,600 pounds gross. The burners consume from 10 to 15 cubic feet of air per minute, and operate under from 40 to 60 pounds pressure. The greater the air pressure the more economical use of oil.. Height to top of shell is from 3 feet to 3 feet 6 inches.

The lid is lifted with a crane attachment and is moved aside in charging and then moved back in place to remain until pouring as in Fig. 2. The furnace tender is not exposed to danger, or waste neat, and one man should be able to attend to four or five furnaces. The lining of the furnace is composed of ordinary first-class wedge fire-brick, and alone weighs 1,000 pounds. The lining will stand about 500 heats. The metal from furnace is poured into receiving crucibles, which should be previously heated with one of the patent oil burners. In case the crucible is overfilled and the metal runs over the side, the workman can either tilt the furnace entirely over or pull it out with a hook through the air and oil opening in order to clean it out, as all metal in the bottom of furnace is in a liquid state while in operation.

A crucible can be taken out and replaced at will with very little labor. As no stack is used with the furnace, it requires no draft or hood, and when air and oil is properly regulated there is no smoke or odor, and the furnace is so thickly lined there is very little waste heat. In starting the fire where oil is used the operator simply uses a lighted torch and turns on air and oil slowly until oil is thoroughly ignited. It is claimed that the air is heated to a temperature of 600 degrees before entering furnace through the new arrangement, which will insure quicker results in melting and a considerable saving in oil.

The Insurance Inspection Co. of Pittsburg, has been organized for the purpose of examining into all kinds of insurance policies and giving the buyer of the insurance a thorough understanding of the scope of his policy at the time it is entered into, or at least before a loss occurs. The examination of these policies is for the purpose of setting forth in concise form the exact indemnities afforded, indicating what amendments in the printed form should be made, and to keep the assured informed as to the character of the insuring companies. By the work of this inspection company, vexatious disputes and disappointing settlements with insurance companies can be entirely avoided. The rates for the service are merely nominal. A specialty is being made of examining into policies covering all kinds of industrial establishments. The offices of the company are at 222 Fourth avenue.

The directors of the Pressed Steel Car Co. held a meeting last week at the company's offices in New York. The only business transacted was the declaration of the regular quarterly dividend of 1¾ percent on preferred stock and 1 percent on common. Heretofore quarterly statements of the company's business have accompanied the dividend declarations, but a statement was not issued this time. The dividend on the preferred is payable May 31 and that on the common May 24.

FIG. 2.—FURNACE IN POURING POSITION.

Some New Things for the Shop, Chiefly by Way of the Patent Office.

Increasing the Grip of a Chuck.

A drill chuck improvement has been patented by Emerson R. Smith, of Oneida, N. Y. The thoroughly dissected chuck is shown piece-meal in Fig. 1 and appears assembled in Fig. 2, and it will be seen that there is a supplementary device for engaging the gripping jaws. The design of this improvement will be best shown by the engravings in Figs. 3, 4, 5 and 6. Fig. 3 is a cross section through the chuck and Fig. 4 shows two views of one of the sliding blocks for engaging the gripping jaws. Fig. 5 shows one side of the separated gripping jaws and Fig. 6 is a like view of the other side of the jaws.

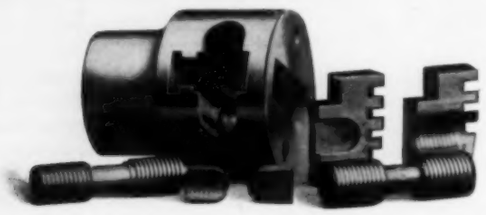


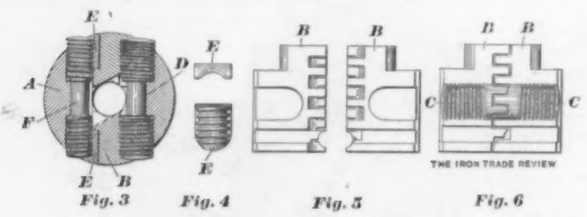
FIG. 1.

FIG. 2.

CHUCK WITH DOUBLE GRIP.

The body A of the drill chuck is formed with the usual groove along the diameter and in this are fitted the sliding jaws B having at one side the screw threads C. The latter are engaged by the right and left hand threads of a rod D which turns in the body A of the chuck. The jaws are thus formed to move forward or from each other according to the direction in which the threaded rod D is rotated. So far the chuck resembles the common device found in the shops. On the other side of the jaws B, as in Fig. 5, are cut guide ways and these are engaged by sliding blocks E. The outer sides of the blocks E have screw threads in mesh with the right and left hand threads of a second spindle F, fitted parallel to the other screw D and similarly arranged to turn in the body A.

In using the device the spindle F is first turned to slide the blocks E the desired distance outward and allow the threaded spindle D to be next rotated, bringing the jaws B into an open



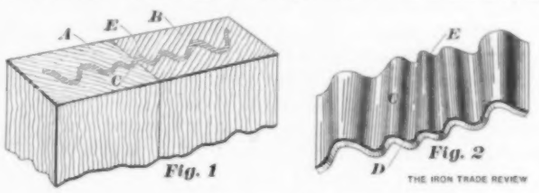
DETAILS OF A NEW CHUCK.

position for the insertion of the drill or other tool. When this has been done, the spindle D is rotated in the opposite direction and the jaws B move toward each other and firmly grip the tool. Then the spindle F is turned by the operator, causing the blocks E to slide along the guide ways until the inner ends of the blocks engage the walls of the recesses in the jaws and thereby get an additional grip on the drill. The jaws F are thus under pressure on both sides and there is not the tendency to cramp the jaws in the sliding groove across the chuck body A. The blocks E only exert a pressure on the jaws B to move them toward each other; moving the jaws apart is reserved for the threaded spindle D as with the ordinary chuck.

A Fastening Device for Wood Work.

This invention belongs to that class of fasteners consisting of a metal plate having a series of corrugations and used for the strengthening of wood joints. The patentee, George C. Wyland, of Williamsport, Pa., has evidently given some thought to the matter of corrugating the plates, and after describing previous devices having corrugations, coarse or fine, according to the character of the work, but of a uniform size in each instance, goes on to say that a fastening device with fine corrugations alone will not hold well in soft wood on account of the insufficient grip on the fibers, and on the other hand a coarse corrugation cannot be successfully driven into the wood because of the width of grain covered by the fastener, the fibers doubling over or the fastener turning while being driven.

The patented device for meeting this condition is illustrated in Figs. 1 and 2, the former a perspective view of a joint formed by the improved method and the latter a perspective view of the fastening device. A and B represent two pieces of wood and C is the fastening device for the joint. One edge of the fastener is sharpened at D to enter the wood easily. The corrugations increase in depth and width from the center to the ends of the plate—taking the central corrugation E as the starting point, the corrugations on each side will increase in size. It is claimed that the device will be the stiffer and stronger in proportion to the fineness of the



A FASTENING DEVICE.

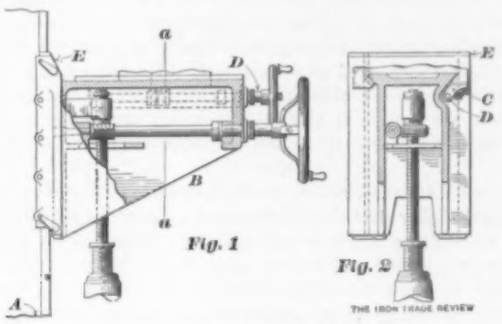
corrugations and that the coarser the corrugations the greater the holding qualities.

Strengthening the Milling Machine.

George K. Garvin, of the Garvin Machine Co., of New York, has obtained a patent upon a milling machine knee—that portion of the machine which sustains the work. The larger the knee the firmer must be its support and the more rigid its general structure. The knee is in the shape of a bracket having one vertical side in engagement with dovetailed guides on the standard and a horizontal top on which the saddle and slide are carried. The top plate of the knee is ordinarily open to permit a nut carried by the saddle to pass through the top and engage with a screw so that the saddle may be adjusted to any position along the top of the knee. This opening is an element of weakness and it becomes more pronounced as the length of the knee is increased, the clamping of the saddle bringing lateral pressures and spring-

ing the sides of the knee together. One of the effects of this yielding of the sides is to separate the vertical flanges which hold the knee upon the standard. When the knee is lengthened the weight of the work which can be placed on the outer end may be excessive and thus strain the vertical flanges at the back.

It is proposed to meet these contingencies by the construction of a knee with a solid top instead of the usual slotted web and carry the back of the knee upward. Fig. 1 is a side elevation of a milling machine knee made in this manner and shows parts in section with a portion of the column or

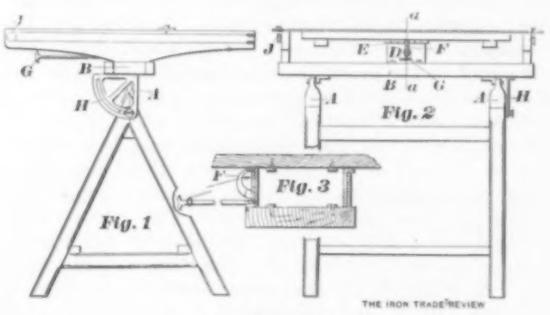


STIFFENING THE MILLING MACHINE.

standard. Fig. 2 is a section on the line a-a of Fig. 1. The base of the machine is seen at A and has the usual dovetailed flanges at the front for the knee. The knee B is a triangular box casting with top, back and side plates or stiff webs of metal. The back plate has jaws embracing the vertical guides on the column, with interposing keyplates clamped by bolts as shown. The knee is adjustable on the column by a telescoping screw and worm wheel in mesh with a worm on the horizontal shaft. The upper side of the knee has guides for the saddle which is provided with the ordinary flanges or jaws and keyplates. The saddle is usually adjusted by a nut passing down through a slot extending from end to end of the knee; but instead of doing this the inventor attaches the nut, as shown at C, to one of the flanges of the knee and puts the threaded shaft D outside the knee casting, leaving the top plate intact and solid. The side of the knee is concaved to accommodate the threaded shaft for adjustment of the work in proper relation to the milling cutter. The lengthened knee is given additional support by an extension E to the back plate which carries the jaws and keyplates high enough to compensate for the extra strains of the lengthened knee.

A Drawing Table.

This has facilities for tilting at different angles and may also be rotated. Provision is made for parallel ruler and clamping of ruler and board in position as required. Thomas L. Austin,



A NEW DRAWING TABLE.

of Erie, Pa., is the inventor. Fig. 1 is a side elevation of the board and support, Fig. 2 is an elevation at right angles to Fig. 1 and Fig. 3 is a vertical section on the line a-a of Fig. 2 and includes the clutch and clamping device. Fig. 4 is a perspective view of the table.

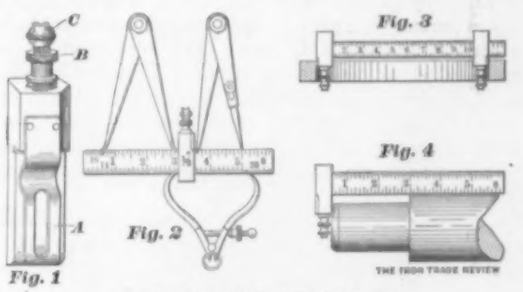
At the apex of the supporting frame is a hinge leaf A with pintles fitting the leaves of hinges fastened to the underside of the beam B. This extends across the table supports and has straight edges C at each end. In the middle of B is attached a short cylinder D and within this fits a ring which slightly projects above the cylinder D and has a flange E with tapered notches. The inner ring is secured by screws to the drawing board. The board may be made round and somewhat smaller in diameter than the distance between the straight edges, but as this matter of complete rotation of the board is for individual choice, the engraving shows a board of the usual

A NEW TABLE FOR THE DRAFTSMAN.

shape and still capable of some degree of rotation. The board is held at the different points of the rotary movement by a latch F which engages in the notches in the flange E. The latch is held by a spring and is drawn out of engagement with the notches by a wire brought to the front of the board. A setscrew G is further employed to secure the board against rotation, and, like the wire, this too is extended to within a convenient range of the draftsman. The table is held at different angles as swung on the hinge connections by means of a slotted segment H and a clamping screw. The straight edges C form in effect the table top and at the ends of these sides are the vertical slots for the direction pulleys J. A cord passes around these pulleys and is attached to the ends of a ruler or straight-edge to take the place of the usual T-square. The arrangement of the pulleys will, it is seen, allow the upper portion of the cord at each side of the table to move in the one direction simultaneously.

An Improvement in Gauges.

The invention perfected by Robert A. Lachmann, of Chicago, and manufactured by the Union Tool Mfg. Co., of that city, is very simple to design but has a wide range of usefulness among mechanics. The improvement consists of a slide which is easily adjusted to a scale and quickly secured in place. The "rule slide," as it is termed, is an accurately finished block with a recess at one side in conjunction with a retaining spring or clip. The slide is illustrated in Fig. 1, and A



THE RULE SLIDE AND ITS USE.

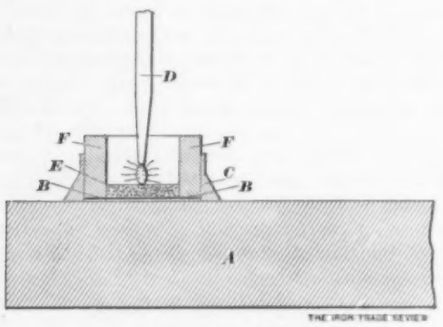
is the clip. A hook with a threaded stem passes through the slide lengthwise and has a nut B. A knurled ball nut and split screw at C form a chuck for holding tram points or lead as may be desired. The screw is beaded over at the end so that the chuck ball at C cannot be lost or mislaid. A spring under the nut B maintains a tension on the scale while adjustments are made.

Fig. 2 shows the setting of three kinds of calipers and it will be noticed that the setting of the calipers is in no wise dependent upon wear of the corners of the scale, these may

be rounded or not without influence upon the accuracy of the adjustment. The setting of the outside calipers is particularly noticeable in this way. The width of the rule slides is ground to a limit gauge and this is stamped on the surface, the slide being hardened prior to the finish grinding. Fig. 3 shows the use of a pair of the rule slides, the combination being employed for calipering an 11-inch bore. Fig. 3 illustrates the rule slide attached to end of scale forming a hook rule and is in this way useful for taking measurements from round corners, through gear blanks, pulley hubs, etc. The use of the combined rule slides as beam calipers, trams, as well as on the blades of squares, etc., will be obvious to the experienced workman. Certainly the setting of calipers against a squarely finished part of the slide and rule combination is decidedly preferable to butting the scale against some more or less accurate surface and then making an attempt to hold the two properly together while the calipers are adjusted.

The Local Annealing of Hardened Steel Plates.

The well known engineer, Charles P. E. Schneider, of Le Creuzot, France, has invented a method of locally softening or annealing hardened steel plates. Cemented and tempered steel plates, such as are used for armoring battleships and other structures, are not to be machined by ordinary cutting or drilling tools. Nevertheless some of these plates require for purposes of construction to be pierced or planed on the hardened surface of impact. This is frequently the case with the armor plates of gun turrets and especially so with armor belt plates. Various methods have been adopted for handling steel plates which have been finished so far as their metallurgical treatment is concerned. Among these are the five following processes: First, successive annealing, with the blow pipe



AN ARMOR PLATE ANNEAL.

with repeated drilling of the softened portions as they are reached and acted upon by the combined operations. Second, local annealing by the passage of an electric current of low tension but great volume. Third, substituting for the cemented surface one of softer metal by means of the electric arc. Fourth, attacking the cemented surface by an acid rendered more active by an electric current. Fifth, wearing away the cemented surface by emery or carborundum placed at the end of a rod or tube of plastic metal. The sole object of these several methods is the piercing of holes of small dimensions; some of the schemes are slow and present certain difficulties in successful application and others have the inconvenience of resulting in uncertain and inefficient work. None of them are asserted to be capable of application to surfaces of considerable area.

The Schneider process is said to have the following advantages. There is no need of any special plant except that required for the generation of heat; it can be applied to quite large surfaces; the heating is of brief duration and can be done on all parts of a plate even if it be considerably bent—say, to the form of a segment but one-sixth of the circumference of a circle—without necessitating the displacement of the plate; the cemented surface of the plate does not present any defects after annealing and may be cut or threaded without difficulty. The method consists principally in bringing into contact with the cemented surface a very fusible metal which is heated to redness by an electric arc or blow pipe. The heat of the arc is regularly and uniformly transmitted to the cemented surface through the medium of the fusible composition, the heat being transmitted to all parts which this conductor touches and solely to these parts. It will be seen, therefore, that if the surface upon which the layer of fused composition rests is limited by an enclosure consisting of some sort of mold without a bottom, it is possible to anneal the plate locally by these means at a place of any desired extent or shape.

One arrangement for carrying the project into effect is illustrated by the engraving. A is the steel plate and the upper side is the cemented hardened surface. That part of the surface which is to be softened will be limited by a frame F made of brick and set on a thin layer of sand B, the latter forming a joint between the brick and the steel plate. The brick inclosure is luted with clay or to use the phrase of the patent papers, has a "border of argillaceous earth" at C. The surface for treatment being thus clearly defined, the fusible composition is poured into the casting in a molten state to a height of several centimeters. An electric arc is then formed between the carbon D and the surface of the composition E. The latter is heated to redness and transmits its heat to the plate.

In order to avoid raising the temperature of the surface of the plate higher than the point of recalescence during the heating, a condition which would cause in certain metals a tempering on cooling, and also to avoid the oxidation and volatilization of the composition, the heatings are alternated with coolings of fairly equal duration. The temperature can be estimated by plunging a small steel bar into the molten metal immediately after the passage of the current. The temperature is then seen diminishing from the surface of the composition to the face of the plate after a very short immersion of the rod. The layer of fusible composition remains red at the surface after a stop of several minutes only when the cemented surface of the steel plate is itself raised to a red heat. Of course the surface of the metal may be covered with soot or pulverized charcoal to prevent some of the waste by oxidation. Several electric arcs may be applied at equal distances when the surface for annealing is of large dimensions. The inventor points out that the fusible composition E should preferably be a metal or alloy of high specific heat. "The only essential condition to fulfill is that the temperature of fusion of this metal or alloy shall be lower than the temperature of recalescence of the part of the plate to be softened. Lead, plumbers' solder, antifriction metal, aluminum, can all be used. The heating of the fusible composition (E) which serves to transmit the heat, can be obtained by generating therein an induced electric current by means of an exterior transformer suitably arranged or by the passage of an electric current through a filament of high electric resistance, which is thereby rendered incandescent."

Belt Shifter Improvement.

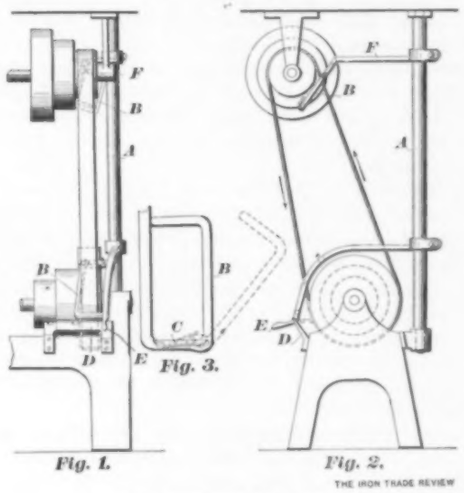
Readers of *The Iron Trade Review* of some three years ago may remember the description of the belt shifter then illustrated from the Brown & Sharpe Mfg. Co.'s practice. The work rooms at the Providence plant are very lofty and a good even tension is maintained on the belts. Throwing belts from one step to another of the cone pulleys would require some little effort for the hands alone, and a disinclination to make the needful belt changes from step to step of the cone pulleys would amount in a plant of that size to a considerable item in the matter of production. Many of the tools, lathes particularly, are equipped with a simple form of belt shifter, a length of stiff pipe reaching from lathe bed to ceiling, supported in bearings and having at the lower end a handle and lever and at the upper end an arm and "eye" for the belt. The arm telescopes as the "eye" and belt shifts from large to small diameters of the cone pulley. The shifter is only employed for the upper cone and the attendant handles the belt directly on and off the steps nearest to him. The scheme is a simple one and works like a charm.

The invention of Hans J. Hoegh, of Princess Bay, N. Y., is intended to go the above device one better but as will be seen is a trifle more complicated. The inventor proposes a close imitation of the hand operation, the belt being positively shifted from a large step to a smaller one on one of the cone pulleys and then is moved from a smaller step to a larger one on the other of the cone pulleys. The belt may be shifted downward a complete step upon one pulley before it is moved upward a step on the other pulley.

The three illustrations present the main features of the

design. Fig. 1 is a front elevation of a pair of cone pulleys, the connecting belt and the shifter, and Fig. 2 is a side elevation. Fig. 3 is a detail plan view of the outer end of one form of belt shifting arm, showing the yielding belt-retaining arm in full lines in its closed position and in dotted lines in its open position. An upright rock shaft A is supported by a step bearing at the lower end and has another bearing at the top end. An upper and a lower arm connect with the upright shaft A, each having a belt "eye." Selecting the upper arm F for the purposes of illustration, it is seen to be connected to the shaft A by a split collar and screw for adjustment. The belt "eye" at the end of the arm F has a hinged retaining strip B, this L-shaped strip being held in place by a spring C. These yielding pieces are arranged on opposite sides of the respective arms. The lower arm is in contact with a notched plate D and is operated by a shifting handle E. The three notches are arranged to engage the free end of the arm when the belt is in the respective steps of the cone pulleys.

When the belt is on the large step of the lower pulley and the small step of the upper one and it is desirable to make a change to the next position, the lower arm is moved by the handle E to the second notch in the plate. The lower arm positively shifts the belt on to the intermediate step so far as the lower pulley is concerned. The yielding piece B of the upper arm F springs as the lower end of the belt is shifted. The small step of the upper pulley, therefore, retains the belt until sufficient slack has been obtained by the complete movement of the lower portion of the belt on to the intermediate step of the pulley. The spring tension of the yielding piece



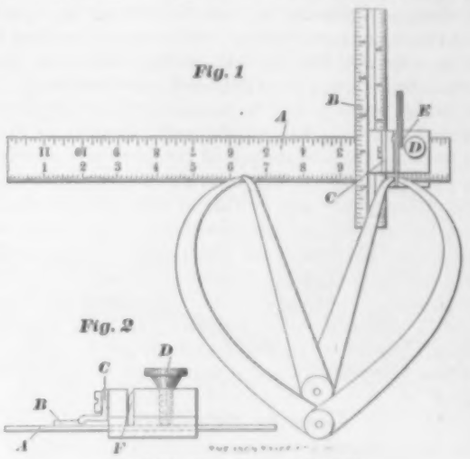
THE SHIFTING OF BELTS.

B is then sufficiently powerful to close the strip against the arm F and this shifts the upper end of the belt to the second step of the upper cone. The reversal of the operation would result in the upper end of the belt being first shifted positively and then the lower end moves yieldingly. The arms engage the belt at a sharp angle downwardly and are arranged at right angles to the taper of the pulleys in order to favor the shifting of the belt by a tendency for it to travel up and along the inclined edges of the yielding strips.

A Thickness Gauge and Square.

Another attachment to the scale is disclosed in the invention of Joseph W. Melvin, of Houston, Tex. Fig. 1 is a plan view of the device and also illustrates the manner of using the gauge. Fig. 2 is a front elevation of the gauge. The gauge includes two blades A and B. The blade A as in the present instance may be the main element, say, a 12-inch rule, while the blade B consists of a 6-inch rule. The two parts are located at right angles to each other and attached to a gauge block. This gauge block is in two parts separated by a liner to a sufficient distance to freely admit the rule A. The two blades are maintained at right angles by an angular plate C having a lip or bead fitting, in a groove in the cross blade B. The vertical portion of the angular blade receives a setscrew tapped into one of the outer faces of the connecting block and secures the plate in place. Fig. 2 shows that the clamp plate is slightly separated from the block to give a frictional engagement of the plate C and the blade B, the degree of contact being regulated by the screw.

A binding screw D is tapped into the block and holds blade and block in any desired position. A thickness plate bottoms in the slot passing through the block and is pressed to one



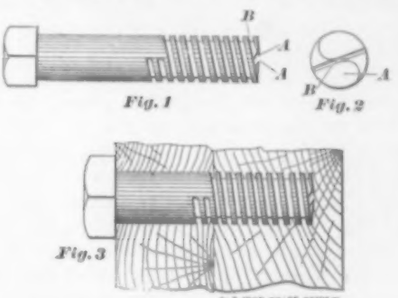
ANOTHER SCALE ATTACHMENT.

side by the spring actuated pin F. The thickness plates E are connected in groups by a pivot so that any one of them can readily be reached. Each plate has a mark designating its use and thickness. The device is capable of a variety of purposes, but assuming that a wheel and axle are to be fitted: a thickness plate E of requisite dimensions is inserted in the slot and is held by the pin F. The workman then takes a pair of inside calipers and measures the axle bore. One leg of the inside calipers, say the leg to the right, is then placed against what is known in Fig. 1 as the inside face of the thickness plate E, the right leg abutting against the upper portion of the block. The left leg of the inside calipers will be sustained upon the upper surface of the main blade A. A pair of outside calipers is then brought into requisition and the left leg is placed against the outer surface of the thickness plate E while the left leg is vibrated up and down until the end engages the left leg of the inside calipers. It will be understood that a leg of each pair of calipers abuts against opposite faces of the thickness plate E, the latter determining the excess of diameter of the axle with respect to its hold in accordance with the particular fit to be made, whether the fit be a force, drive, running or another kind. After the adjustment of the outside calipers they may be used for measuring the diameter of the axle, shaft, or other part to be fitted into the hole.

The inventor has started the manufacture of this caliper gauge and square and has formulated tables for shrink, force, drive, and running fits, to be used in connection with the invention.

Steel Screw Improvement.

A peculiar form of steel screw has been invented by Magnus Carstens, of Davenport, Ia. His object is to produce a screw



SOMETHING DIFFERENT IN STEEL SCREWS.

which will be the same diameter for the entire length and which will cut its own way or thread in the material which is to be secured. He does not limit the thread of his screws to any particular form nor to double, triple or other threads. Fig. 1 is a side elevation of a double threaded screw and Fig.

2 is an end elevation. Fig. 3 is a detail view showing the screw fastening two blocks of wood together.

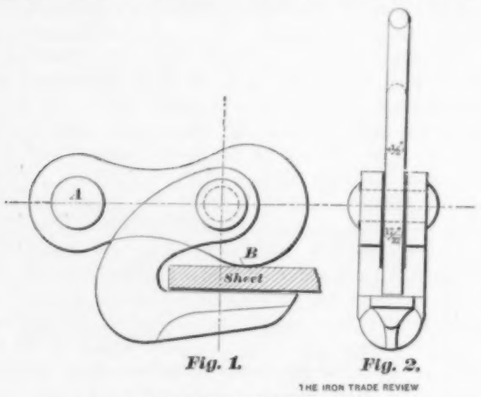
The end of each thread is tapered, nicely rounded off to the body of the screw and beveled to form a cutting lip A. It will be seen that the two lips A are exactly opposite and cut V-shape as illustrated at B so that the cutting lips of the ends of the threads are slightly in advance of the point of the V-cut in order that the lips will quickly engage the material into which the screw is to be threaded. As there is no cutting center to this screw it will be necessary before the screw can be inserted to bore a hole of the same diameter as the core of the screw, so that the threads of the screw will merely have to cut their own way in the material. The patentee suggests that the core of the screw—that is the body of the screw between the base of the threads—be cut away to permit the cutting lips to take hold of the material quickly and positively.

These screws are not only intended for use in wood but in securing together pieces of comparatively soft metal. In order that the screws may be forced into metal the cutting lips and threads are to be hardened and tempered.

Just how these screws are to be made commercially is not explained.

Clamp for Metal Sheets.

E. E. Aires, foreman boiler maker at the shops of the C. H. & D. railroad, at Lima, O., has designed a simple clamp for suspending sheets. Two of these clamps are necessary when holding a sheet suspended as at A, Fig. 1, where the maximum capacity of the clamp is utilized. Fig. 2 is an end view of the clamp, but in this case the sheet has been removed, the two views being selected to exhibit the extreme positions of the clamp elements. A chain or hook is used to connect



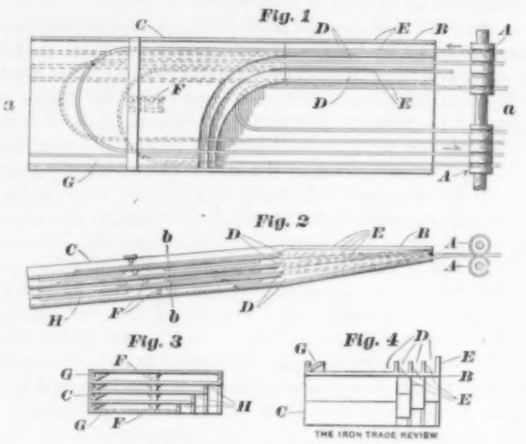
A SIMPLE SHEET CLAMP.

the clamps, the center of the chain being attached to the hoist. The weight of the sheet forces the lever B downward, clamping the sheet firmly. The size of the clamps may be varied according to the thickness of the material handled. The clamp is made of cast steel and is positive as the cam is forced the more strongly against the sheet with greater weights. The inventor points out the uncertainty and danger of the common hooks, especially when these are applied to bent or crooked sheets.

Combined Guide and Guard for Overfeed Wires.

Claude M. Zellers, of Cleveland, has an improvement for handling the loops of wire about the rolling mill. These wires are apt to become entangled when allowed the usual free course and the invention is designed to prevent the formation of scrap from this cause as well as save the labor necessary to keep the wires free in their overlapping portions.

Fig. 1 is a plan view of a set of rolls with the invention in place. Fig. 2 is a longitudinal elevation in section on the line a-a of Fig. 1. Fig. 3 is a cross section on the line b-b of Fig. 2, and Fig. 4 is a front end elevation of the improvement where the wire enters from the rolls. As thus shown the device is an independent structure with, say, a width of eight feet and proportionate length according to the needs of the rolls and is erected near to the set of rolls A having the passes for the wire. The plan of the invention provides for keeping the loops of the several wires apart by horizontal divisions of the device so they will come one over the other and have free play within their own domain. The initial portion B is subdivided with walls and the rear portion C has compartments, the two forming one structure but with different functions. Thus the portion B has as many guide channels D with side walls E as there are wires to be handled and the walls are high enough to keep any wire from work-



WIRE SEPARATOR FOR THE ROLLING MILL.

ing over into another channel than its own and at last to guide the loop as it forms back into its own compartment in C. The portion C is subdivided with compartments, one above the other.

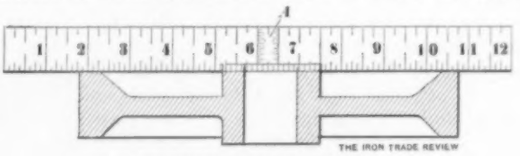
The walls E, with the exception of the outer one, gradually incline toward their respective compartments and then merge in the floor surface. Each channel inclines from the same plane at the front to its compartment at the rear and the wall at the inner side of the channel has the same relative height for its entire length. The wire is thus compelled to travel toward the appropriate compartment and cannot spring from the appointed path.

It is not expected that the wire loops will run further back than the guard but the rear of the several compartments is left open to meet a contingency of this kind. Drop checks F are pivoted in the top of each division; these swing back to pass the wire loops to the rear but compel the loop to pass behind as it is taken up by the receiving rolls. The width of the compartments is constructed according to the passes taken by the wire in the rolls; in this instance the compartment of least width is at the bottom for the wire which takes the innermost passes.

Obviously a man will stand between the rolls to lead the ends of the wires from one roll to the other, after which the several wires work on their own guides to the proper compartment. A V-shaped wall or inclined portion G is provided at the outer wall within each compartment to catch or wedge and prevent rebound of the end portion of the wire after it passes from the first rolls, clears the grooves and whips around the check F. The wire travels quite rapidly in some cases and the whipping is likely to curl or knot the stock. The walls at one side of the rear portion C are slotted their full length more or less as at H for the introduction of rods or tools to remove accumulated scrap. The bottom of each compartment forms the top or cover of the lower compartment and these divisional plates are removable one after the other when it may be deemed necessary to get into one of the compartments.

A Patented Scale Graduation.

A resident of St. Kilda, Victoria, Australia, has brought out a method of scale graduation. The inventor, G. Crocker



THE GRADUATION OF SCALES.

Smith, has a series of graduations running across the middle of the scale. This is shown at A where the scale is being applied to a gear for measuring the projection of the hub beyond the rim.

FLEXIBLE SHAFT WITH BALL BEARINGS.

A flexible shaft is no new thing but a flexible shaft with hardened ball bearings is a novelty and this latter form is illustrated in the following engravings. A flexible shaft made of wire cable alone will sooner or later crystallize and break down under strain. The broken cable must then be thoroughly cleaned, the ends tinned with solder, and a ferrule sweated on the ruptured section, as is shown in the repaired cable of Fig. 1. The connection, however, is at the expense of the strength and flexibility of the shaft. These considerations

FIG. 1.—FLEXIBLE SHAFT CONSTRUCTION.

caused the Coates Clipper Mfg. Co., of Worcester, Mass., to undertake the design of a flexible shaft which is made up of a series of hardened steel universal joints of the ball and socket order. The socket halves are seen in the center of Fig. 1, and these are surrounded by the assembled elements bent to a circle to illustrate bending possibilities. This type of joint allows a high speed with but little friction and in the event of fracture a new shell may be inserted and the shaft is equal to its previous strength and just as flexible. It will be seen further that the elements are of a form permitting equal facility in either direction of the drive and will transmit as much power backward as forward.

The flexible shaft is fitted with a simple sleeve clutch so that the operator by giving the sleeve a quarter turn disconnects the clutch and this little matter of disengagement permits the workman to stop the tool wihout leaving his work for the purpose of shifting the driving belt. The shafts

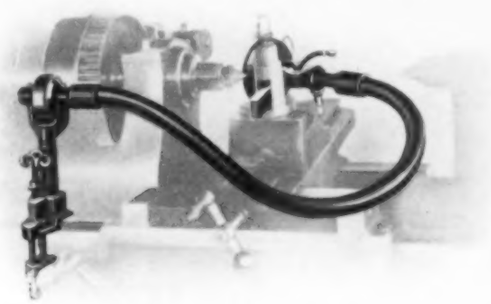


FIG. 3.—FLEXIBLE SHAFT AND CENTER GRINDER.

are made in a number of sizes on this unit system and the standard sections are readily joined for greater lengths.

A number of devices have been designed by the manufacturers for connection to the flexible shaft. These include drill presses, breast drills (the latter having gearing entirely covered by a housing), portable and stationary electric motor drives, etc. A die sinker's engine, for example, has a multiplier, speeded up to 8 to 1, and will operate small emery wheels from 1-inch down to ¼-inch from 10,000 to 12,000 r. p. m. The multiplier is held in the hand and with flexible shaft connection results in a close control of the rapidly cutting tool.

A recently designed cutter grinder which may readily be employed for internal grinding is illustrated in Fig. 2, where the tool is seen in operation on the blades of a reamer. The reamer rests on the centers of a lathe and the emery wheel is driven from the cone pulley, a clamp holding the driving wheel in contact with the surface of the large step of the cone, and the flexible shaft transmitting the power to a scored pulley which gives the requisite velocity to the abrasive wheel. The center grinder of Fig. 3 is readily understood from the halftone and Fig. 4 is an equally obvious exhibit

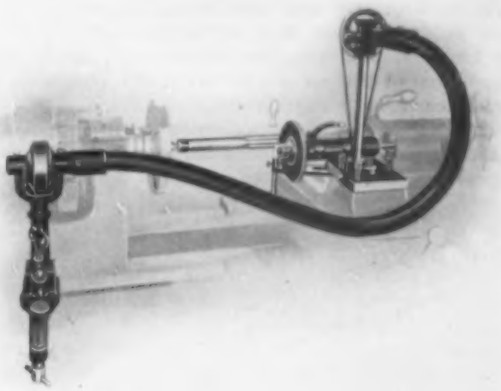


FIG. 2. FLEXIBLE SHAFT AND FITTINGS FOR CUTTER GRINDING.

of shop adaptation, the grinder being here employed on a casting in the early stages of a "bicycle" finish.

Another use for the flexible shaft has been found in polishing pins or screws. Ordinarily these are rotated with the fingers, as they are pressed against the buff wheel, always an awkward task, with the rapidly heating bits of metal and the irregular manipulation. The work, temporarily attached to the end of a rapidly rotating shaft, is conveniently held against the polishing wheel and spins with speed and uniformity. The shaft has lately been applied to a portable hammer and the results encourage the manufacture of larger sizes. These at present are under way and suggest the shop possibilities of flexible shafting with positive drives, and

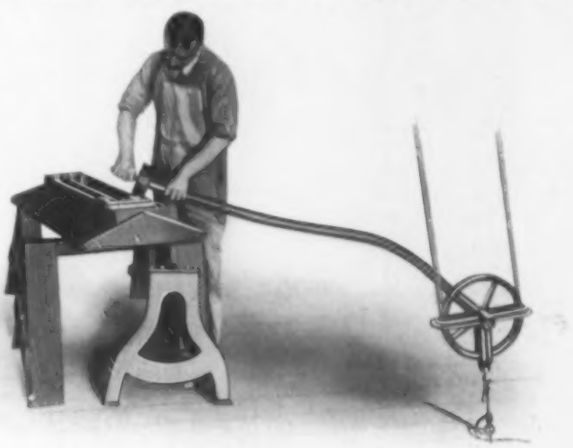


FIG. 4.—THE FLEXIBLE SHAFT FOR CASTING CLEANING PURPOSES.

the construction of the Coates shaft is evidently adapted to intermittent loads.

Louis P. Minkel has purchased a building formerly used as a planing mill at Hamburg, N. Y., and has fitted it up for use as an iron foundry. He will do a general jobbing business, and has purchased the necessary equipment.

The American Iron & Steel Mfg. Co., Lebanon, Pa., has posted notices suspending operations in its puddle mills and placing its forge department at the central works on a five-day per week schedule.

Hydraulically Forged and Rolled Solid Steel Railway Wheels—I *.

BY HENRIK V. VON Z. LOSS.

Railway transportation, with its problems—road bed as well as rolling stock—has in later years claimed more than its share of capital and inventive thought, and, as was naturally to be expected, in no other field of engineering have the undertakings been on as large a scale or of more practical and scientific interest to our profession. It has been the speaker's fortune to have been associated with the development of the steel car, and, as his experience in this field has been somewhat extensive, the necessary results of the introduction of that car and its technical requirements as to detail became early very apparent.

Immediately upon the introduction of the 100,000-pound car, the repair sheets of the different railways showed abnormal accounts, thus on the face of it tending greatly to eliminate the possibility of the adoption of this innovation in transportation. A little investigation, however, proved that an unexpectedly large amount of the expense was caused by breakage of the wheels, and having no direct bearing upon the car structure proper. That such should be the result was, after all, quite natural, when one considers that though the car capacities were but recently increased from 60,000 pounds up to 80,000 pounds, and finally up to 110,000 pounds, the substructure proper, which is represented by the wheels, was practically left untouched, barring the occasional adding of 50 to 100 pounds in weight, a heavy iron wheel of 33 inches diameter weighing today about 750 pounds.

It is pertinent to recall, in this connection, that both the axle and the rail have been increased in large ratios to sustain the increased duties. The swaying of the heavy steel car, in connection with its increased static load, proved, in many instances, ruinous to the flanges when passing switches or curves; and Mr. Schoen, the inventor and promoter of the steel car, suggested several years ago the possibility of applying a solid steel wheel, because of the fact that no additional weight or thickness could be given to the wheels at the spot where they most needed it, namely, at the root of the flange. In fact, the full economy of the large capacity steel car has never been realized, nor will it be until supported by a wheel, the flange of which will permit increased mileage with a practical elimination of wrecks. With this in view, all data and processes bearing upon the subject were investigated, and, about two years ago, the writer undertook to design for Mr. Schoen a plant to accomplish the purpose with a final result the success of which is witnessed by the samples herewith shown to you, as well as

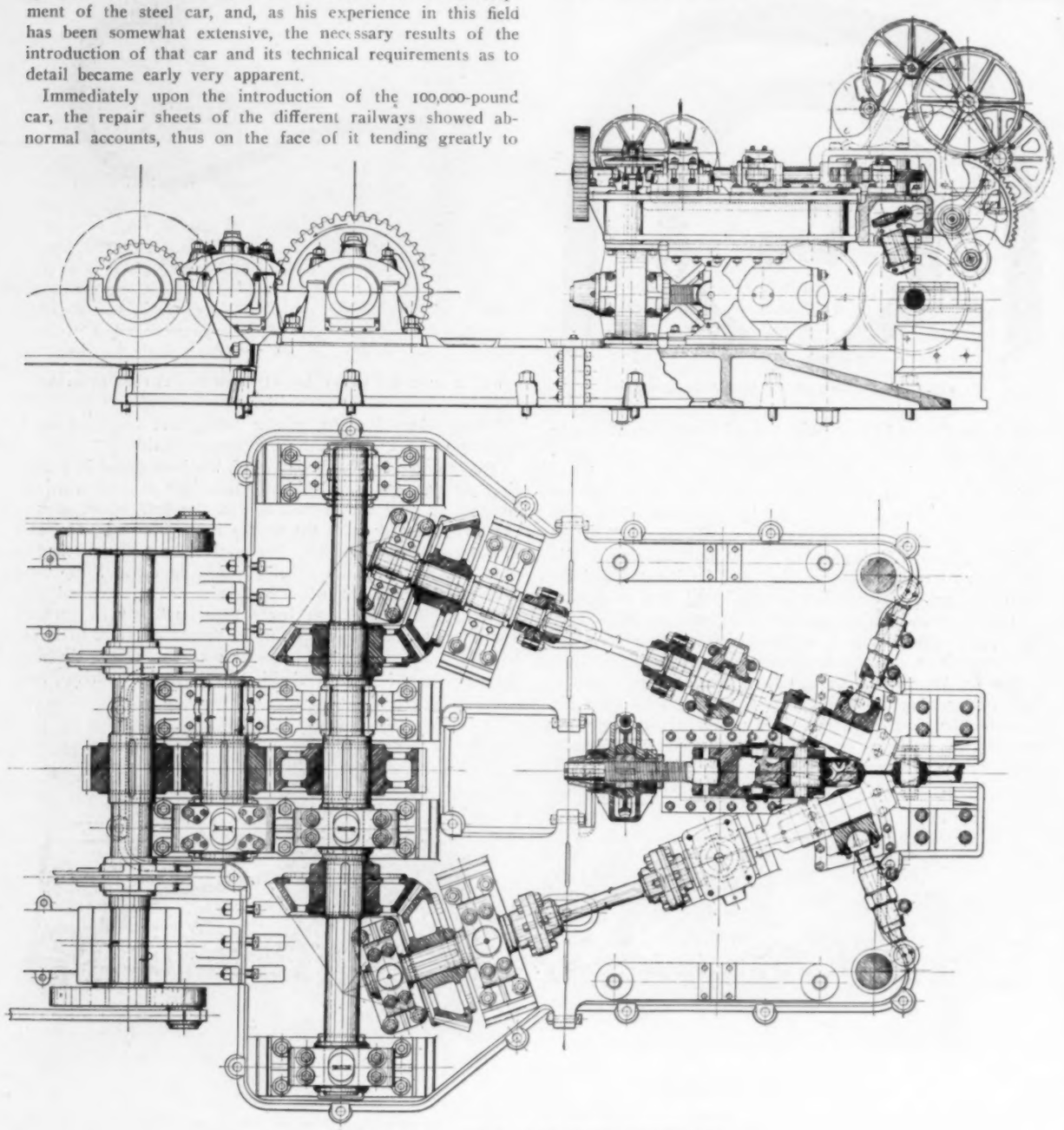


FIG. 1.—ELEVATION AND PLAN OF WHEEL ROLLING MILL.

*A paper read before the mechanical and engineering section of the Franklin Institute, Philadelphia, Pa.

by the wheels now being tried on the different railways; and again, as indicated by the views of the machinery and product accompanying this paper.

Evolution of the Wheel.

The development of a perfect wheel is a matter of evolution. The first step in this series, after making the plain cast iron wheel, was to make it with chilled tread. The next, in order to secure safety, was to make a steel tire and fit it to a wheel center. This style of wheel is now used almost exclusively throughout Europe, and to a considerable extent in the passenger service of this country; but, as there is a great deal of work expended in producing such a wheel, it naturally becomes very expensive. It appears that the ideal product should be made of steel of proper quality, all in one piece and forged and rolled to a perfect finish.

In order to make a successful steel wheel the balance sheet must again, first of all, be taken care of, and with this in view the price of such a wheel must be limited to a figure which shall bear a certain relation to the one of cast iron. In order to throw some light on the subject, the writer secured, a few years ago, some information from one of our leading railways, which will enable us to form an approximate opinion. It was found from two years' run, covering 5,320 cast iron wheels (33 inches diameter and all legitimately worn out) in passenger service, that the average life per wheel was 56,000 miles. One hundred steel-tired wheels of the same diameter, and used in the same class of service, and similarly worn out, had an average mileage each of 265,000, or a ratio of 4.71 to 1 in favor of the steel wheel. Two hundred and sixty-five thousand miles is a very conservative estimate for steel wheels, because individual records of wheels show mileage as high as 380,000; showing what, under proper conditions, can be looked upon as a possibility.

Referring to the application of steel wheels for freight service, the railroad in question kept no records of the mileage for any wheel used in this branch of service; but with cast iron wheels, the date of the wheel as cast upon it will give the desired information. During the same years 62,461 wheels, all legitimately worn out, were withdrawn from the service, representing an average age per wheel of eight years and three months. The average mileage per year of a freight car, as taken on the same railroad and during the same years, appeared to be 9,243. Multiply the average life of a wheel by the average yearly mileage of the car, and the result will give a fair approximate value of the average mileage per wheel for its entire life.

Pursuing this process, the average mileage of a cast iron chilled wheel in freight service was found to be 76,260. There were no steel wheels used for freight purposes; but if we assume that the proportion between the life of a steel-tired wheel and a cast iron chilled wheel remains the same, whether in passenger or freight service, the average life of a steel-tired wheel, under a freight car, would be 360,000 miles, or representing a life of over thirty-five years.

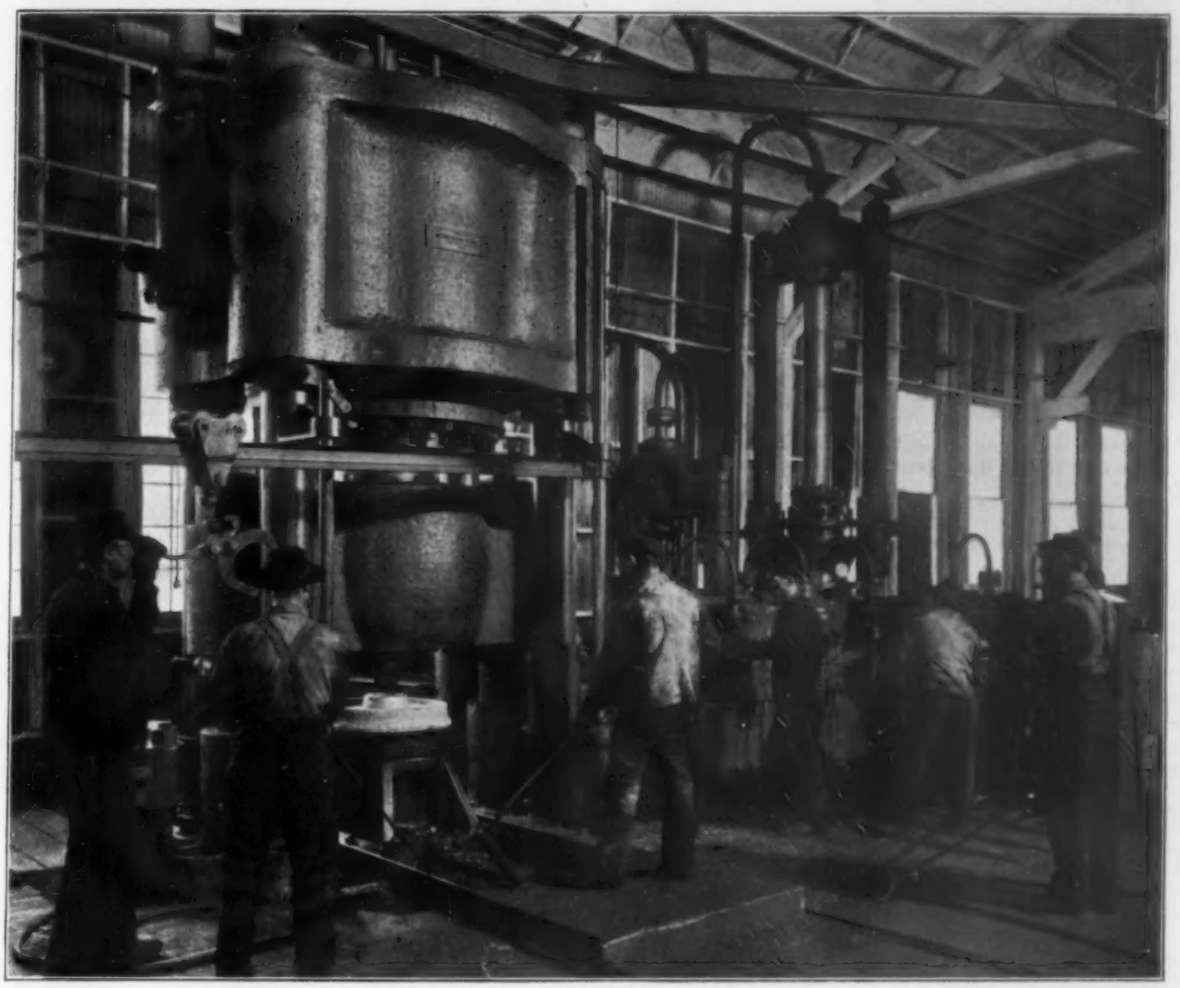


FIG. 2.—5,000 TON FORGING PRESS. FORGING OF THE HUB AND PUNCHING OF THE HOLE.

The above mileages are based upon the practice of the average wooden 60,000-pound car, and must be greatly modified when applied to the modern 55-ton structure. It has been stated by the representatives of one of the greatest freight carrying railroads of the country, that the average mileage of a cast iron wheel, when carrying the large capacity steel car, is about 35,000; and if we use this figure as a basis, the life of a steel wheel should be in the neighborhood of 150,000 miles when based upon the data previously given. Using these two figures as a foundation for a financial comparison, the following data explains itself:

Assume as average service of cast iron-wheels (miles)	35,000
Assume as average service of steel wheels (miles)	150,000
Assume as cost per wheel of cast-iron wheels	$8 75

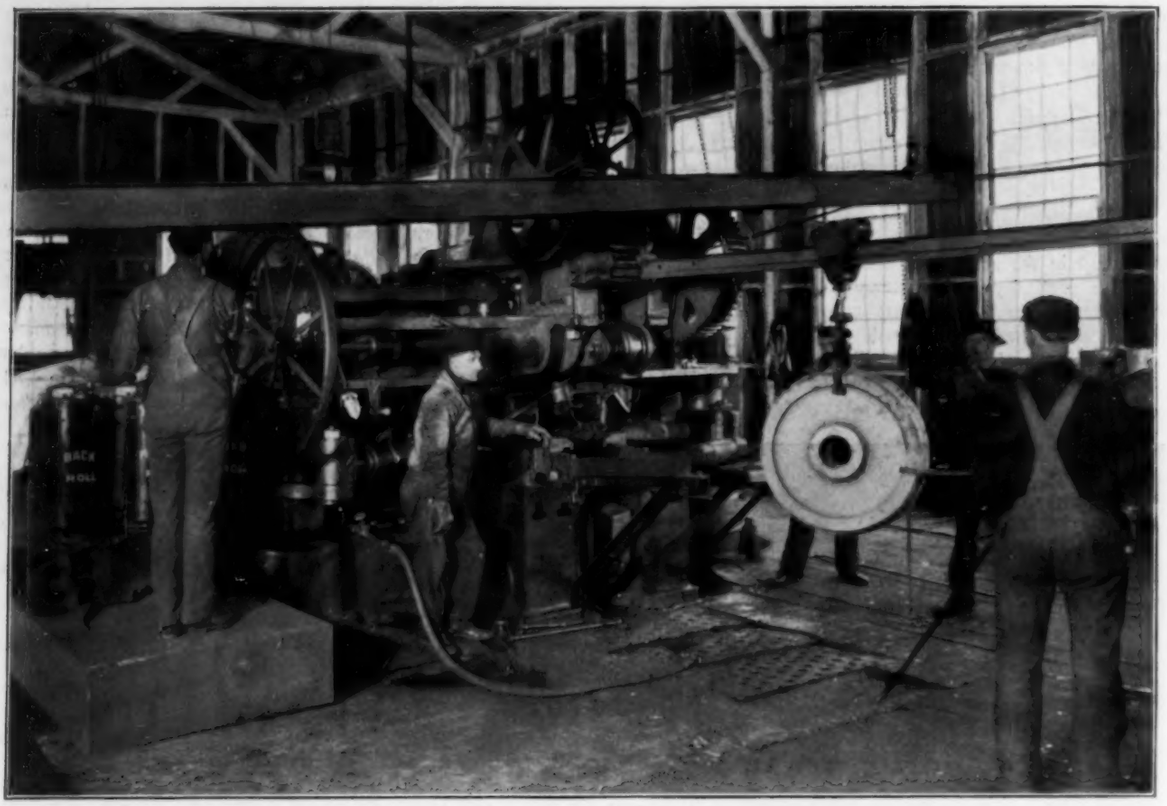


FIG 2.—VIEW OF ROLLING MILL TO WHICH WHEEL IS BEING CONVEYED.

On this basis the cost of each 150,000 miles of service, with cast-iron wheels, would be....$37 45
Less scrap value of about 4.25 cast wheels at 70 cents per hundredweight 17 98

Net cost for 150,000 miles with cast-iron wheels..... $19 47

Adding to this last figure the value of a scrap steel wheel, which is about $5, we find the allowable price for a wheel of this type to be $24.47, not allowing for any other saving due to immunity from wrecks, as caused by defective cast iron wheels, etc. In the above it has also been assumed that the boring and mounting of the different cast iron wheels is about equivalent to the "truing up" of the steel wheel. Another point, which may be worth mentioning in this connection, is the fact that as the cast iron wheel weighs at least 700 pounds, while the steel wheel weighs about 80 pounds less, there is a saving in dead weight per car of at least about 640 pounds.

Process of Manufacturing the Rolled Wheel.

The process as used in the manufacture of our new wheel is about as follows:

A round ingot, approximating in outlines the shape of a wheel, but of a quite smaller diameter and greater web thickness, is placed in a movable bottom die-holder of a 5,000-ton forging press; this machine being illustrated by Fig. 2, where the blank is first reduced in thickness. During this same stroke the hub is forged and finished and the hole punched—all in one operation. The original blank or ingot is about 4 inches less in diameter than the finished wheel, and its

FIG. 4.—VIEW OF ROLLING MILL, ENGINE AND PUMP. WHEEL IN PROCESS OF ROLLING.

central body has a thickness of from 2 inches to 2¼ inches, which is reduced by rolling to a final web thickness of wheel of from ⅞ inch to an inch.

The forging press consists of a large bottom cylinder located below the floor, working through vertical, hollow-forged nickel steel 15-inch bolts on a movable cross head, to which the top die is attached. The bottom die holder is stationary from a vertical point of view; but is operated horizontally by a hydraulic cylinder, so as to facilitate the introduction of the blank and removal of the finished product. Above the forging cross-head with its top die, is located another large hydraulic cylinder in which works a piston, the lower end of which engages into the cross-head and is guided by the same. This piston performs two functions, viz., first, of punching the hole, after which the piston continues downward, coming to a stop inside the forging cross-head, adding its pressure to that already existing upon the top die, and hence finishing the hub under the combined pressure of the two rams, which amounts to about 5,000 tons. The punches are not stripped; but they are split automatically, leaving the lower half remaining in the wheel blank, and this is afterwards removed before going to the rolling mill. Most of the mechanism is automatic, and hydraulic cranes are attached so as to minimize labor. The two conical rolls of the rolling mill are driven by a 1,000-h. p. engine. Electric alarms call the attention of the operator when the thickness of the web and the rim have reached their limit. The work of the actual rolling process consumes from one and one-half to two minutes.

The third and last step is the coning of the wheel, which is done in a separate 1,000-ton press that is provided with the proper dies and handling mechanism. In this machine the rim is pushed downwards so as to give the proper relation between the edge of the hub and the edge of the flange, and it should be added here that this peculiar shape of the wheel furnishes a small degree of elasticity, which is beneficial under load. The entire three processes are performed in one heat, and the transportation machinery, from furnace to press, from press to rolling mill, and again from the rolling mill to the last press, are all worked out so as to be as near as possible automatic, and will reduce the entire complement of workmen, including heaters and boys, down to about ten or twelve, this number also covering the men who are handling and distributing the cold blanks previous to charging.

FIG. 5.—HEATING FURNACES.

Patents for all this machinery have been applied for throughout the leading countries of the world, and most of them have already been granted. The industry represents mechanical problems absolutely unique and of great interest to the engineering fraternity.

Quality of the Steel After Working.

It is readily seen that in designing the different tools which make up this process, as well as in selecting the process itself, the main mechanical point in view has been to put as much work on the material as possible, and, when referring to the rim, it is perfectly natural that, in order to secure a homogeneous metal in this part of the wheel, it is of interest not to have too much material congregated at that particular place. From financial reasons one would arrive at the same result; because when considering the long life of a steel wheel, the increased first cost, with its compound interest, due to the carrying of this additional thickness for a number of years, will tend to counteract whatever benefits might be derived by having a little longer life. It must also be remembered that as the wheel is a solid

FIG. 6.—SECTION FROM RIM OF CAST STEEL BLANK.

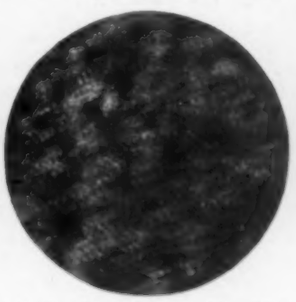


FIG. 7.—SECTION FROM ANOTHER PORTION OF RIM OF CAST STEEL BLANK.

FIG. 8.—SECTION FROM RIM OF FORGED AND ROLLED STEEL WHEEL.

FIG. 9.—SECTION FROM ANOTHER PORTION OF RIM OF FORGED AND ROLLED STEEL WHEEL.

finite and self-contained structure, with the rim rigidly connected to the web, it is possible to run with a thickness of rim that would be absolutely prohibitory with a tire, because in this latter case such a thickness, not being backed up by anything but its own inherent strength, would be stretched by the rolling action and become loose on its center.

While on the subject of finance, we might also refer to the cost of the steel-tired wheel. It must be understood that the great underlying purpose for the introduction of the solid steel wheel is not directly one of competition with the center and tire construction; but is rather to be considered as a forward step in the freight trade. And with this in view, it is pertinent to say that should it even be impossible to claim the same amount of molecular work done on the metal, and also the same high excellence generally for the solid steel wheel as that which is claimed for the steel-tire construction, the difference would be so small as to be of little account when considered in the light of the difference in the market prices of the two products.

In order to throw all possible light upon the effect on the metal as caused by this process of manufacture, and referring especially to the result of the kneading action in the rolling mill, some experiments were made by Messrs. Williams, Brown & Earle. A section of a wheel was given to the above firm to be highly polished, etched, magnified under a microscope and subsequently photographed. This magnification was about 50 to 1, and when making allowance for the magnification in the lantern the picture as thrown upon the screen will have been magnified in a ratio of about 1,500 to 1.

In order to form a better comparative opinion, pieces of the original and untreated blank were also investigated by the same concern and in a similar manner. The first two cuts, Figs. 6 and 7, represent the original metal, the lighter being of a little denser structure than the darker one, though both show an entire absence of any uniformity or regularity in their molecular make-up. Figs. 8 and 9, however, are taken from part of the rim of the finished wheel, and show a decided beneficial effect of the processes through which the wheel has passed.

(Concluded in issue of May 12.)

Lake Superior Iron Mines.

Preparations have been made for the stripping of the Burt mine on the Mesabi, by Winston Bros & Dear. It is expected that about 150,000 yards will be removed this year.

The Drake & Stratton Co. has begun operations at the Fayal mine on its stripping contract. Four shovels have been put to work. The whole contract amounts to 2,000,000 yards to be removed in three years. It is said that more than 1,000 men will be employed by the contractors.

Preparatory to beginning stripping operations at the Forest mine, on the Mesabi, the Wallace Construction Co. is moving its outfit from Lucknow, four miles from Buhl, to its new work. This stripping contract is not large as compared with some others, but the labor of about 200 men will be required for a number of months.

E. J. Longyear, a well known mining man on the Mesabi range, says that drilling for iron ore will be more active this year than many supposed. Mr. Longyear has 26 drills at work on the Mesabi and four more on the Baraboo range. He says there is some inquiry regarding prospective drill contracts in other territory. A number of drills are at work on the Vermillion range and more will soon be employed.

After months of exploratory work the Longyear Mesabi Land & Iron Co. has struck a body of iron on the western end of the Mesabi range, one-fourth of a mile from the new town of Aurora. The drilling is still progressing, the crews working from the north to the south lines, and the results, so far, are very encouraging.

Lon Merritt, one of the pioneers of the Mesabi range, is reported to have made discoveries on Hunter's Island which lead him to believe that it will be a large producer of iron ore. The International Iron Mining Co. has been organized by Mr. Merritt and associates to explore this new territory, which lies on the Canadian side, a short distance north of the Minnesota State line. The ore is supposed to be a continuation of the formation in the Vermillion range.

VISE WITH FOOT LEVER.

Two illustrations are given of the Goodrich vise, manufactured by the Williams Vise Co., of Chicago. The jaws and the pressure screw and handle, which adjust the grip, are of the ordinary pattern. The main difference between the Goodrich vise and the common type is in the connection or hinge of the two halves of the tool. A sliding bar has a pin connection for linking to the outer leg of the vise and slides through the extremity of the other leg. A foot lever swings in line with the vise leg and projects far enough to the right to permit ready action by the foot of the workman and at the same time allow space for the tripping device used in releasing the foot lever.

Fig. 1 shows one of the heavy vises and Fig. 2 is a 15-pound vise. The former vise is worked by the foot directly in the manner already outlined and the smaller vise has a wire attached to the foot lever, while another wire is fastened to the release grip, both being attached to foot plates so that the vise is set and released exactly in the same way as the heavier vise.

The collar or bench strap is bored out and the corresponding part of the vise is machined to fit. The dowel and collar formed on the foot of the vise and in combination with the bench strap allow the vise to be adjusted at various angles

FIG. 1.
THE GOODRICH
HEAVY VISE

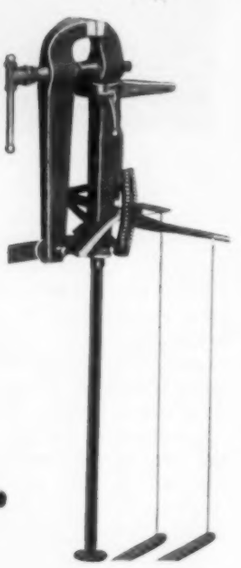


FIG. 2.
A 15-POUND VISE
FOR GENERAL WORK

to the bench at the pleasure of the workman, and a quarter movement of the locking lever at the right clamps the tool firmly in the chosen position. The jaws are kept parallel by setting the outer leg in or out on the slide bar by use of the holes and the adjusting pin. Then the jaws at the top of the vise are adjusted by the screw so that the piece will have from 1-16 to ⅛-inch play for ready insertion, and the foot lever may then be pressed down until the required grip is secured. To remove the piece from the vise, the trip lever is lightly touched and the spring promptly frees the work in readiness for the next piece and without further adjustment. The vise is made in a number of sizes from 15 to 200 pounds.

The Japanese Government has placed a large order for turret lathes and other machinery for making projectiles. The order was placed through Takata & Co., a large American-Japanese concern, and was given to German manufacturers. As has been noted in these columns, Japan is in the market for $500,000 worth of machinery to equip a navy yard, and American manufacturers have been endeavoring to secure the orders.

Adrian Furnace of the Rochester & Pittsburg Coal & Iron Co.

Among the considerable number of Northern blast furnaces producing iron for the foundry trade erected in the past few years is the Adrian furnace of the Rochester & Pittsburg Coal & Iron Co., at Falls Creek, near DuBois, Pa. Its location with regard to fuel supply is ideal, having coal within two miles, while the coke is shipped a distance of but seven miles. While furnaces erected at Lower Lake ports save rail transportation on the ore, on the other hand the fuel haul is expensive. The location of the Adrian stack, having direct connections with the Pennsylvania railroad and the Buffalo, Rochester & Pittsburg railroad, permits the shipment of iron into Pittsburg and other Western Pennsylvania points, Northern and Central Pennsylvania and Western New York at comparatively low freight rates, and the increased cost of ore is nearly overcome by proximity to fuel supply and the additional advantage of having this supply owned by the company.

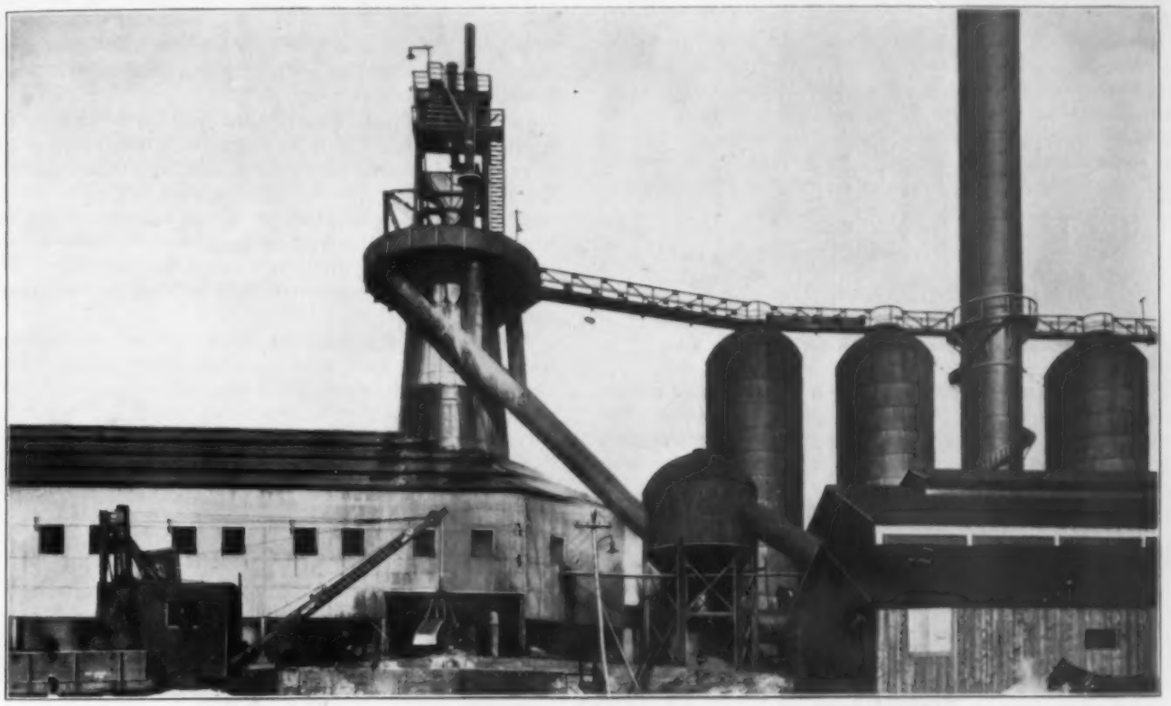


FIG. 1.—ADRIAN FURNACE, ROCHESTER & PITTSBURG COAL & IRON CO.

Raw material is brought into the plant over four wooden trestles, 18 feet high and 16 feet wide. The ore is dumped from the cars direct into the ore yard, and wheeled in barrows to the stock house, where it is delivered into the charging buckets. The coke is dumped into two steel coke bins of 200 tons capacity each, located at the foot of the skip hoist from which it is drawn directly into the charging cars.

The furnace, which was designed and built by Julian Kennedy, of Pittsburg, is 80 feet high and has a bosh diameter of 19 feet 6 inches, 12 feet at the hearth, 13 feet at the stock line and a bell diameter of 9 feet. From the height of the stack and the bosh diameter it will be seen that the stack has been given more slope than has been the late practice, this height and slope having given the best results in the use of fine ores. The top is of the Julian Kennedy enclosed type, without explosion doors, and the bell is operated by hydraulic cylinders working in oil. There are two dust catchers. The primary is connected with the downcomers and the gas main leading to the boilers, while the secondary is connected with the primary dust catcher and the gas main to the stoves. The furnace is built with hearth jacket construction. There are twelve 5-inch tuyeres. The furnace is located in the center of one end of the cast house, which is 210 x 70 feet and of substantial steel construction. The slag is run into a pit located outside of the cast house where it is granulated and removed and loaded on to cars by a McMyler standard gauge revolving crane.

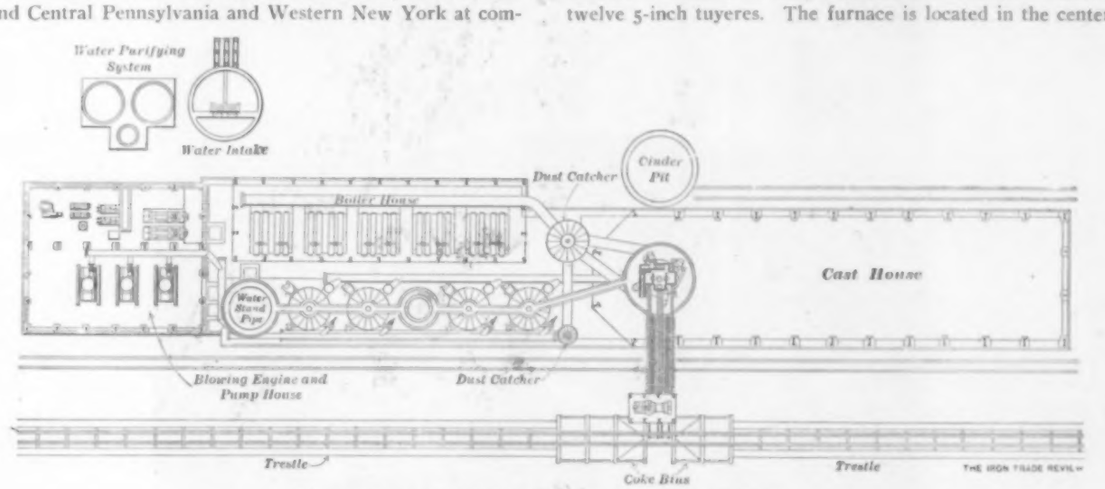


FIG. 2.—PLAN OF ADRIAN FURNACE AT FALLS CREEK, PA.

The four hot blast stoves are 80 x 22 feet, of the Kennedy type, with central combustion chamber. The fittings include the Morrison and Hugh Kennedy patent chimney valve con-

nections. The central stack for the boilers and stoves is 175 feet high. The boiler house is 150 x 40 feet and contains five batteries of 500 h. p. each of Cahall boilers equipped with Spearman and Kennedy patent gas burners. The power house is of brick construction 90 x 43 feet with a lean-to 90 x 30 feet.

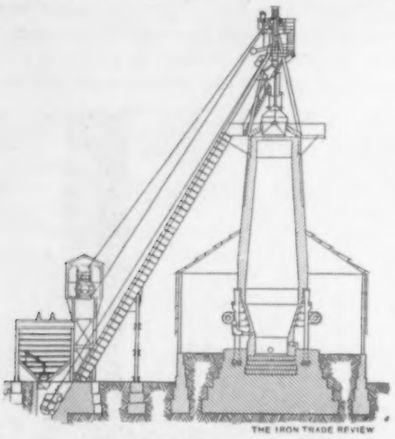


FIG. 3.—SECTION OF FURNACE, HOIST, SKIP AND BINS.

It is equipped with a 25-ton Pawling & Harnischfeger electric traveling crane running the entire length of the building. The three blowing engines are in the main span of the power plant while the pumps are located in the lean-to. There are two horizontal duplex compound non-condensing steam pumps, outside center packed 16 x 28 x 18 x 24, built by the Snow Steam Pump Co., two Wilson & Snyder boiler feed pumps, 8 x 14 x 7 x 18, and two Stilwell-Bierce & Smith-Vaile hydraulic oil pumps, 10 x 12½ x 12. The electrical equipment consists of one 75-k. w. General Electric generator, direct connected to a 120-h. p. Harrisburg engine.

The three blowing engines were designed and built by the Morgan Engineering Co., of Alliance, O., to specifications of Julian Kennedy. Since the installation of these engines a fourth has been built for the South Chicago Furnace Co., South Chicago, Ill. The engines are of the vertical long crosshead type, simple, non-condensing, and have the steam cylinders below the crosshead and the air cylinders above. The diameter of the steam cylinders is 44 inches, while the air cylinders are 84 inches in diameter. The stroke of the engine is 60 inches. Thus at 42 r. p. m. each machine will deliver about 16,000 cubic feet of free air per minute, at 25 pounds above atmospheric pressure.

The main bed plate rests directly upon the foundation and is cast in one piece. It is very massive, strongly ribbed and in every way suitable for rigidly supporting a heavy machine like these engines. The bed plate is cored to receive a thick layer of babbitt metal which forms the bearings of the flywheel shaft. These bearings are very carefully bored to size, scraped and provided with ample means for lubrication. The caps for the main bearings are held in place by four 3-inch tap bolts.

The flywheels, of which there are two to each engine, are 20 feet in diameter, each weighing about 50,000 pounds. They are well counterbalanced and calculated to run at a speed much in excess of that to which they are subject under the hardest service. The central hub of each flywheel is of cast iron and strongly keyed to shaft. These hubs form crank discs into which the crank pins are forced and riveted. The rim of the wheel is made in halves and securely fitted to the disc. In the rim it will be noticed there are recesses to allow for barring the wheel. The crank pins are 10 inches in diameter and are made of the best grade of steel forgings of about

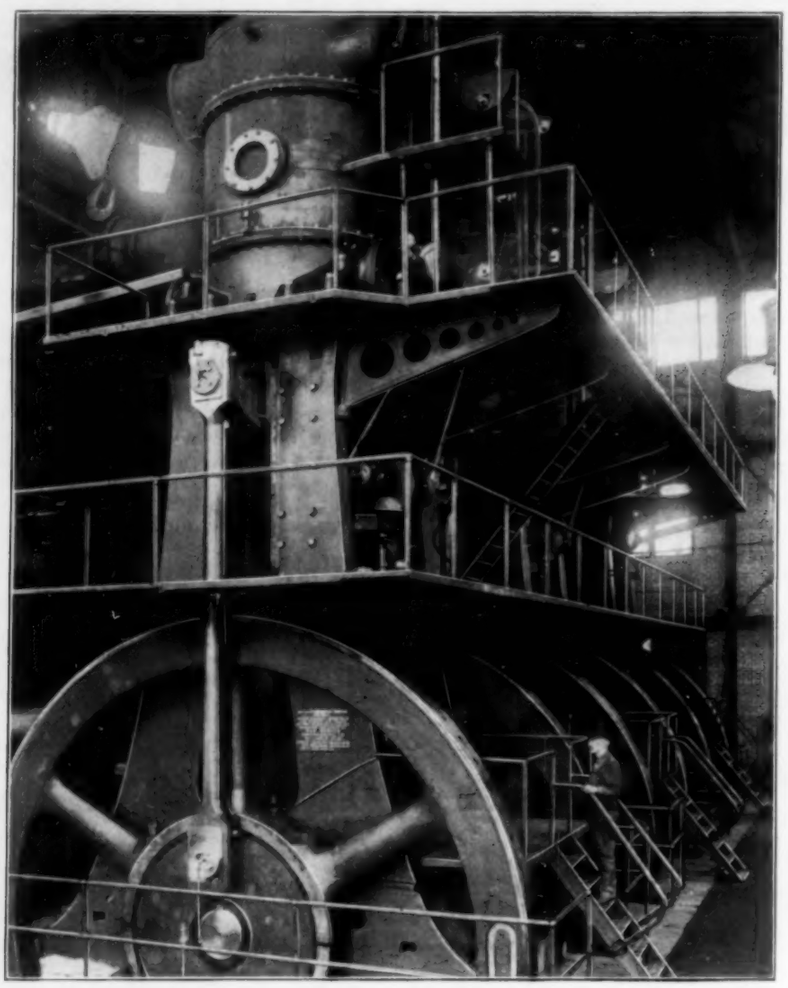


FIG. 4.—VIEW IN BLOWING ENGINE HOUSE OF ADRIAN FURNACE.

.40 percent carbon. The main shaft is 20 inches in diameter. The connecting rods, of which there are two to each engine, are of open-hearth forged steel, .25 to .30 percent carbon. The rods are of the solid end type, provided with the necessary brass boxes, babbitt lining, adjusting wedge, etc., arranged to take any wear in the bearing.

The steam cylinders are made of specially selected cast iron stock, and each contains four valve chambers for the valves which are of the Corliss type. The exhaust chamber is cast separate from the cylinders, thus reducing internal condensation. The steam cylinders are lagged with Keasby & Mattison non-conducting covering and furnished with sheet steel jackets with corner angles. A relief valve is located in each end of each cylinder. The crosshead is a steel casting carefully annealed and ends turned to form the crosshead pins. The shoes of the crosshead are of cast iron, faced with babbitt metal. Each engine has two side housings or frames, which, as will be noted from the illustration, extend up and form the support for the air cylinder. These housings are rigidly constructed and stiffened by cast iron cross braces.

As is the case with the steam cylinder, the air cylinders are also composed of specially selected cast iron stock, having as close a grain as consistent with good machining.

The air valves are of the Kennedy patent horizontal piston type, both inlet and outlet valves being double ported and 24 inches in diameter. The inlet valve has a simple harmonic action, but the outlet valve mechanism is so arranged as to give quick opening at the instant of delivery and insure a long pause on return stroke. The whole system receives its motion from the lay shaft, gearing from the main shaft of the engine. Great care was used in designing these valves and connections that they might be sufficiently strong and yet not contain weight detrimental to their proper operation.

Each engine is equipped with an exceptionally good throttle valve, complete set of galleries and railings, supported by tasteful iron brackets. There is also a complete set of oiling devices and accessories and nothing is left undone to insure proper lubrication and adjustment of the various working parts at all times. The total weight of each of the engines is about 400,000 pounds.

Water for the plant is secured from Sandy Lick creek, and owing to its impurities a water purifying tank had to be installed. The We-Fu-Go system was selected and was installed by W. B. Scaife & Sons Co., Pittsburg. It consists essentially of two settling tanks, and a small chemical tank, with the necessary pipe connections, to admit the raw water to either of the settling tanks or the chemical tank, with pipe connections to draw off the purified water from either the settling tanks at the top by means of hinged floating take-off pipes, and with waste or wash pipes to get rid of the sludge collected in the bottom of either of the settling tanks. In this plant a heater is used on account of the character of the water, which is one containing refuse from tanneries and coal mines, and be-

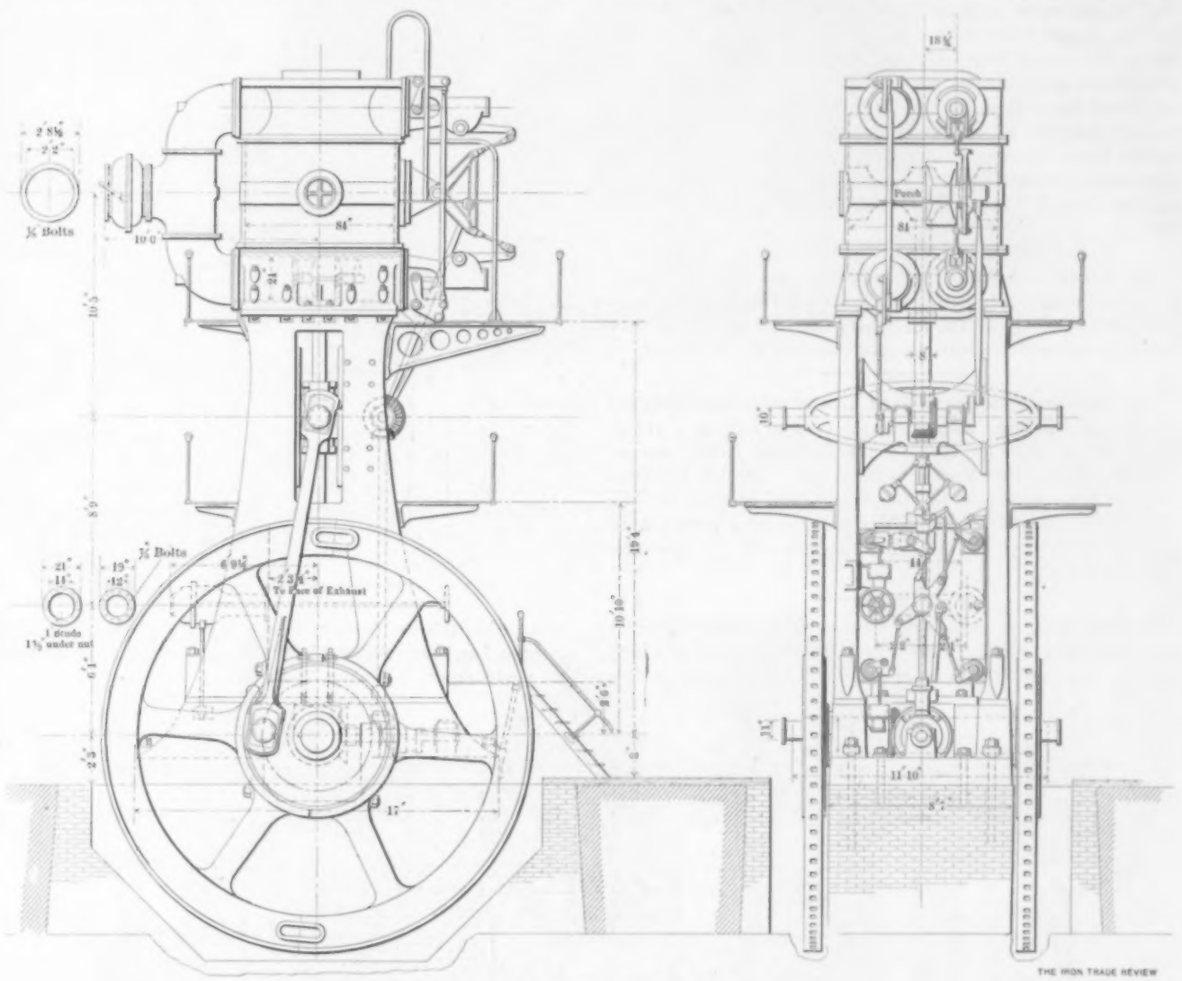


FIG. 5.—FRONT AND SIDE ELEVATION OF BLOWING ENGINE.

sides frequently containing free sulphuric acid in addition to some organic acids left in the water from the tanning processes. The operation is as follows:

The left hand tank is filled with raw water through the heater, which is fed with waste exhaust steam from the feed water heater, and when filled the exact amount of chemical reagents is weighed out and put into the small chemical tank. Water is added and all is washed into the settling tank. The water is then stirred to make complete and intimate mixture between the chemical reagents and the water. This is then permitted to stand until the scale forming and corroding impurities settle to the bottom of the tank. After this it is run by gravity through a gravity filter and into a clear well and from the clear well it is pumped into the boilers.

When pumping from this tank the right hand tank is being filled, treated and stirred and settled, and by the time tank No. 1 is empty, tank No. 2 is ready. They are used alter-

nately in this way and a constant supply of pure soft water is kept on hand for use in the boilers. This plant is located outside with a small housing over it to protect the operator from the weather, and is placed convenient to the boiler room. The apparatus furnishes clear soft water, which is preventing the accumulation of scale, not only in the boilers, but in the heaters and piping as well. It is also preventing corrosion which would necessarily follow the use of water containing organic and mineral acids.

The site owned by the furnace company consists of about 80 acres. Work on the plant was commenced on June 15, 1902, and the stack was blown in on August 10, 1903. Lucius W. Robinson is president and general manager of the Rochester & Pittsburg Coal & Iron Co., and T. W. Kennedy is furnace superintendent.

The Prince Iron Works, New York, recently incorporated, were formed to take over the business of the Prince & Kinkel Iron Works so as to drop the name of Mr. Kinkel, who retired from the business in 1901. The company is occupying the same premises with additional space in both structural and ornamental departments; also installing a riveting plant and additional heavy machinery so as to allow prompt delivery of riveted material, as well as beams and shapes which it constantly carries in stock for quick delivery. The machinery for these improvements has been bought and is now being erected, and the shops will be turned over to the new corporation about May 15.

The Gonce Lock & Mfg. Co., Chattanooga, Tenn., is nearly ready to begin operations. Work on the building has been finished and nearly all the machinery has been installed. The company will manufacture the lock patented by Mr. Gonce.

The Jackson Agricultural Iron Works property, consisting of the old buildings with frontages of 250 feet on Twenty-eighth street and 245 feet on Twenty-ninth street, east of Second avenue, New York, has been sold. The old buildings will be demolished and the property resold in plots for the erection of tenement houses. The Jackson Iron Works were established in 1857 and have been continuously in operation since that time.

Wichita, Kan., is to become headquarters for the Crescent wire tightener, which is used for tightening and stretching barbed wire and woven wire fences. The company which now makes this article is located in Chicago. The controlling interest has been purchased by George W. Earp, of Wichita, who will establish a plant in that city.

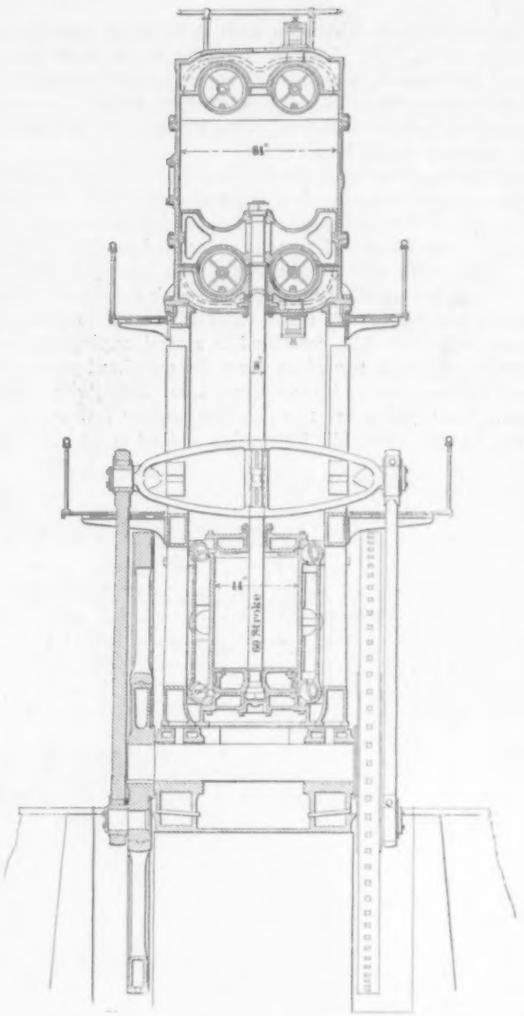


FIG. 6.—VERTICAL SECTION OF BLOWING ENGINE.

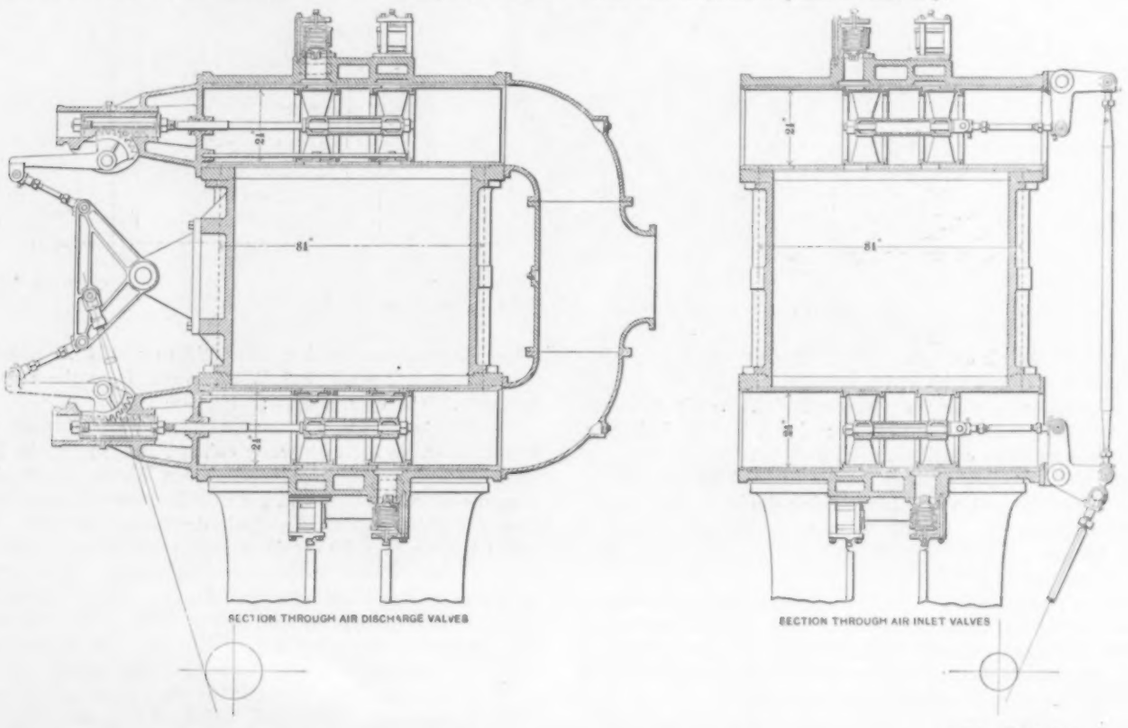


FIG. 7.—ARRANGEMENTS OF AIR VALVES OF BLOWING ENGINE.

A SHAPER-PLANER MODIFICATION.

The machine tool shown by the engravings has attracted a considerable amount of attention during the past four years in the shops of the Ajax Mfg. Co., of Cleveland, and its general utility has led the firm to add it to the list of machinery it regularly manufactures. It is to be built in sizes from 48 up to 144 inches, the one selected for illustration being equivalent to a 60 x 60-inch planer.

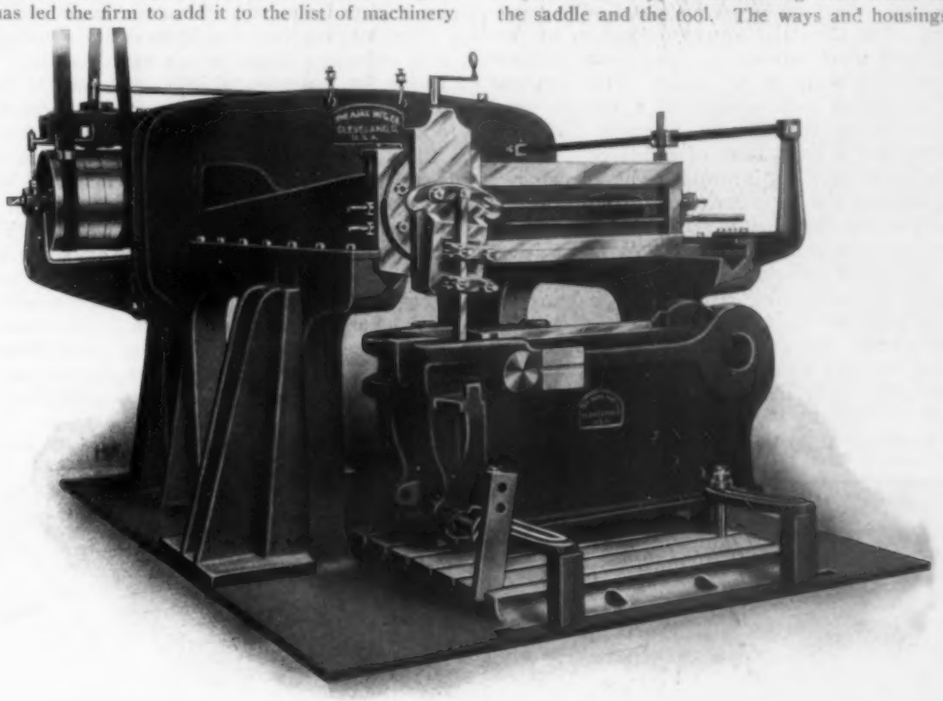


FIG. 1.—A NEW MACHINE TOOL.

The machine may be as easily considered a development of the shaper as of the planer, for the head reciprocates and the work remains stationary. Nevertheless it will remind those familiar with the planer expedients of the jobbing shop in handling heavy work with light tools, where a planer, for example, has had a substantial slide rest bolted to the platen and the casting machined shaper fashion. The firm makes a line of heavy machinery, such as bulldozers, forging machines, etc., and the weight of the beds for these machines adds considerably to the belt resistance when they are machined on the average planer. The shaper plan of operation has been adopted, therefore, and the machine consists of a heavy base plate with housings at each side, carrying the ways. These support the moving head which in turn carries the saddle and the tool. The ways and housings are bridged by a stoutly proportioned cross beam bearing the driving mechanism. The head is driven by rack and pinion, 2½-inch diametral pitch and 8½-inch face, and can be reversed in a travel of one inch when running at high speed. High speed has here something more than the usual meaning when applied to planer practice, on account of the extremely light load borne by the belt in addition to the cutting resistance of the tool; and the head being the only part in reciprocating motion the 3-inch driving belt operates the machine at a cutting speed of 40 feet per minute and has a return speed of 45 feet per minute. The tool has a vertical feed up to a maximum of ⅛ inch and has a cross feed up to a maximum of ¼ inch.

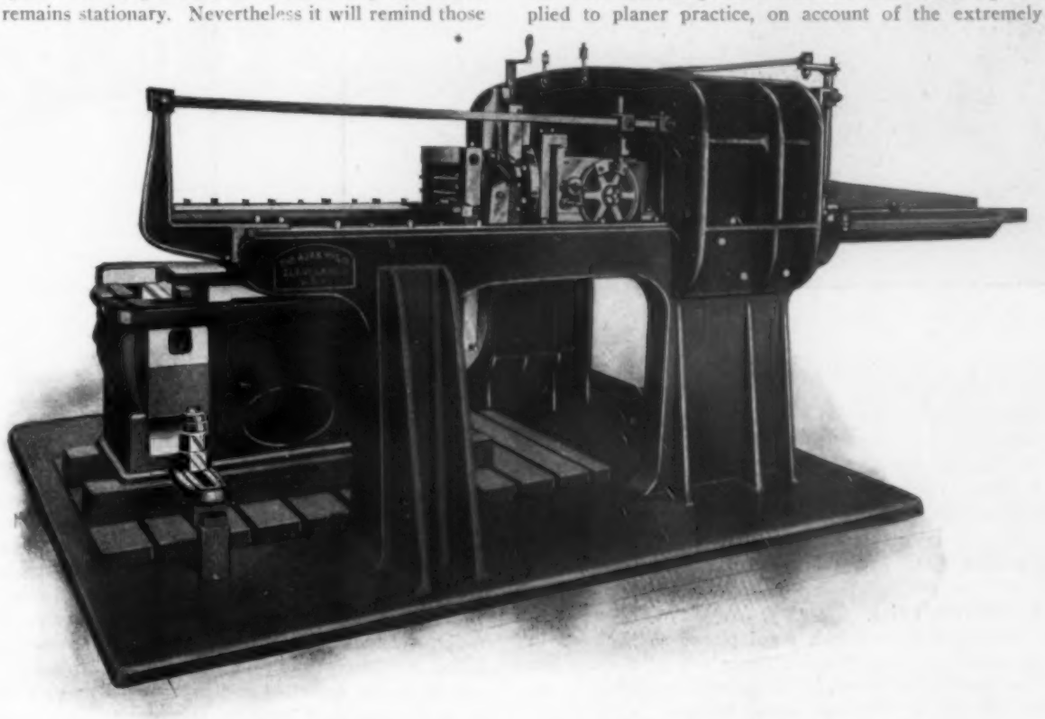


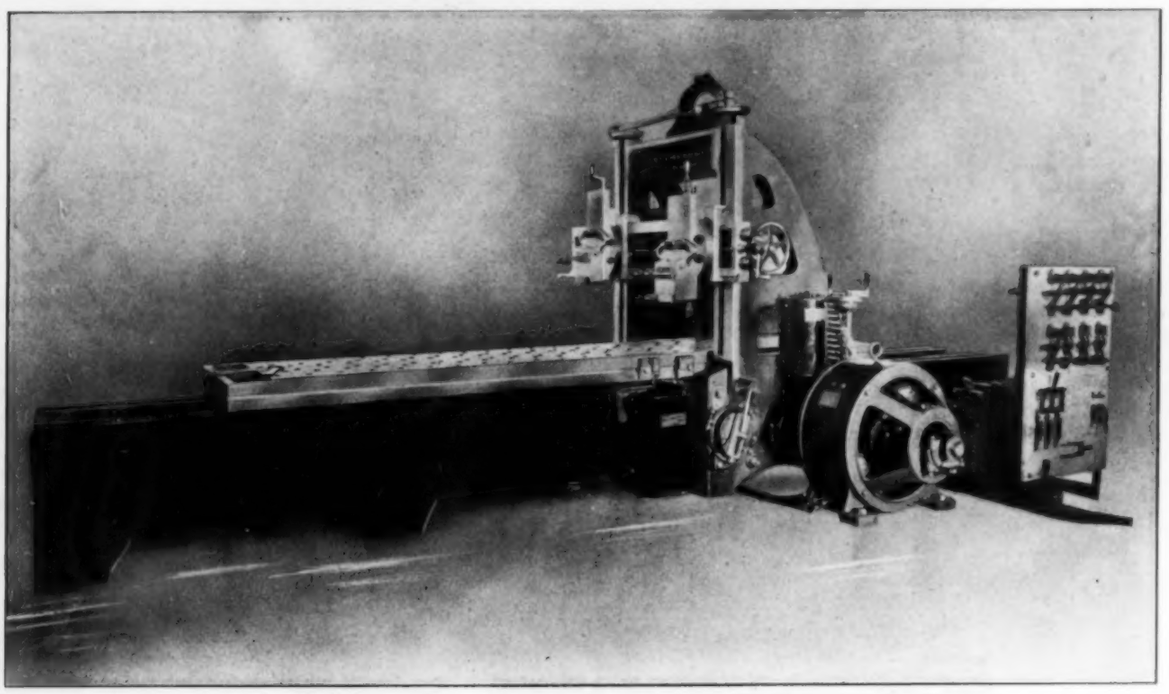
FIG. 2.—ANOTHER VIEW OF THE NEW MACHINE TOOL.

A NEW ELECTRIC DRIVE AT ST. LOUIS.

The World's Fair exhibit of the Electric Controller & Supply Co., of Cleveland, marks an epoch in the development of electric motor driven machinery. Heretofore it has been the custom to use some form of friction clutch with motor-driven planers. The Cleveland company, however, has developed a controller which makes it possible to gear the motor directly to the cross shaft of the planer. The apparatus necessary to a complete outfit consists of a variable speed motor, an accelerating controller, a reversing switch, a speed controller, and a small bank of resistance. The reversing switch is automatic, but is provided with a hand lever by which the operator can bring the planer to a stop at any moment. He also uses this lever to set the length of stroke and determine the position of the reversing dogs. The dogs then operate this switch automatically at the proper moment. The function of the accelerating controller is to bring the armature to a stop, reverse it and increase the speed so smoothly and quickly that a total stroke as short as five inches has been obtained with absolutely no sparking at the brushes of the motor. The amount of overload is accurately predetermined.

The speed controller is so located as to be convenient to the operator and has a handle with notched wheel and graduated dial. The workman can turn it to give him the most economical cutting speed for the work in hand and can change it at will while running. This feature is a great advance over the friction clutch drive which required a change of gears to change the cutting speed, entailing great loss of time and generally not giving the most economical cutting speed after all. The return speed is usually fixed at twice the highest cutting speed except in case of a planer which cuts both ways. In the latter case a speed controller is provided for the return also.

The company has a 36-inch Pond planer so equipped in operation at its St. Louis Exhibit, Space No. 28, Section No. 5, and has another in successful commercial operation in the machine shop of the Wellman-Seaver-Morgan Co. in Cleveland, and is now working on several additional equipments. This type of controller is also adapted to the electric motors of reversing mill tables. The amount of overload is predetermined and it is impossible for the operator to damage the motor.



A NEW ELECTRIC DRIVE.

The Zenith Furnace Co., Duluth, Minn., has increased its capital stock from $600,000 to $1,000,000.

CLEVELAND MACHINERY AT ST. LOUIS.

Cleveland manufacturers of machinery will be well represented at the St. Louis Exposition. While the exhibits may not be as numerous as those of some other cities, they will be very creditable and will attract much attention.

The Macbeth Iron Co. is making a working model of a coal unloading bridge and a model of the "Swedenborg" bucket for the same, which it will have at the exposition. This model will be in actual operation, unloading coal from a model lake vessel and depositing it on dock or in cars.

The Acme Machinery Co. is preparing an exhibit of its complete line of bolt and nut machinery at the exposition. This exhibit will comprise a large bolt heading, upsetting and forging machine, which will be in operation, also one automatic nut tapping machine and one automatic bolt threading machine, which will also be in operation, and which the company fells confident will excite much interest. It will also have on exhibit several of its regular bolt threading machines, nut tapping machines and one of its newly designed nut making machines. This exhibit promises to be one of the finest and most interesting this company has ever had at an exposition.

The J. G. Brill Co., of Philadelphia, will make an elaborate exhibit at the St. Louis Fair of cars and trucks, showing the output of its Philadelphia and St. Louis plants. On account of unavoidable delay, the company will not be able to make a display of cars built at the G. C. Kuhlman plant, Collinwood, O. The Kuhlman plant is about to ship a very handsome city parlor car, which it has been building for Gen. Bancroft, President of the Boston Elevated Ry. Co., Boston. This car is 37 feet over all and is mounted on solid frame forged trucks built by the Philadelphia plant of the J. G. Brill Co. These trucks are of special build all through, as the car is built and is to be equipped to run a mile per minute. The car is finished in solid mahogany with inlaid marquetry work in the panels. It has full empire ceiling highly decorated and ornamented in gold leaf, and is to be equipped with beautiful upholstered plush seats and velvet carpet to match. The windows are of polished plate glass highly embossed and draped with silk curtains and draperies. The car will be equipped with a combination mahogany buffet and ice chest, and undoubtedly will be the handsomest car of its kind ever turned out.

The exhibit of Kaltenbach & Griess will be in the Transportation building and will consist of one of their Standard No. 3 railroad pile drivers. This machine is a heavy steel

car, 1,000 pounds capacity, arch bar trucks, on which is mounted a sluing frame carrying the pile driver leads, and engine and boiler. The sluing frame revolves in a complete circle and the machine is also self-propelling.

The exhibit of the Reliance Gauge Column Co. consists of 49 Reliance safety water columns, which are in practical use on boilers as follows: Babcock & Wilcox water tube boilers, 16 columns; Heine safety water tube boilers, 8 columns; Franklin boilers, 4 columns; Cahall vertical boilers, 4 columns; Cahall horizontal boilers, 17 columns. The Cahall boilers are manufactured by the Aultman & Taylor Machinery Co., Mansfield, O. The Cleveland company also has a large number of its traps at the exposition, not strictly as an exhibit, but in practical use in the steam plant.

The Atlas Car & Mfg. Co. will have turntables, scoop cars, self-oiling wheels and cars for use in smelting furnaces, together with self-dumping skips on exhibition at the St. Louis World's Fair in connection with the exhibits of the Big Gulch Mining Co., and the Arizona Mining Camp. They will also have electrically propelled cars with radial draft rigging in the Transportation building, and a number of cars in connection with exhibits of other manufacturers.

The Fraser Machine Works changed their name to the Industrial Machine Works, May 1. This company will have nothing of its own at the St. Louis Exposition excepting the model of a brick pressing machine which it made for the American Clay Working Machinery Co., of Willoughby, O. This model is one-eighth of actual size, made of aluminum and steel, and will be in operation.

The National Acme Mfg. Co., will show several machines in operation, working both brass and steel. One of the machines will turn out steel parts, machine finished, including lettering, and all operations simultaneously performed. The lettering is placed on the back of the shoulder, and this is the severest test for accuracy that can be applied to any screw machine, whether single spindle or the Acme multiple spindle. The company believes that the performance of this machine will be thoroughly appreciated by visitors having a mechanical turn of mind.

The Elwell-Parker Electric Co. will not itself make an exhibit at the exposition, but its motors will be there in other exhibits.

The Electric Controller & Supply Co. had its exhibit in operation on the opening day of the fair. For its promptness the company will be given ten points on the awards, as the managers have offered that inducement to concerns having their exhibits ready at the time of the formal opening. This company's direct action electric planer and its lifting magnets will be two of the features of its exhibit.

The Brown Hoisting Machinery Co. will exhibit its cranes and other machinery and will also have an exhibit of its ferroinclave, the invention of Alexander Brown.

The Van Dorn Iron Works will show their several lines of steel products, and a novel feature will be a complete prison cell made with the latest improved appliances for the prevention of jail breaking. Steel office furniture, fire proof and very light, will also be exhibited.

Automobiles built in Cleveland will make a fine display. The Winton company will have its gasoline automobiles displayed in the Transportation building and the Baker company will show its electric machines. Other companies manufacturing automobiles will also probably make exhibits.

The Standard Welding Co. does not expect to exhibit at St. Louis, as it could not make a working exhibit and does not think it would be of advantage to it unless this kind of an exhibit could be made. Numerous other companies have expressed their opinion in similar language.

The Long Arm System Co. will have in the exhibit of the United States Navy Department, one horizontal power door and one emergency station for operating the door. These devices are installed as part of a model ship arranged to exhibit standard navy appliances.

The trustees of the bankrupt Port Washington Foundry Co., Port Washington, Wis., have been unable to get a bid for the property for more than one-third of its value, and will attempt to dispose of it at private sale. The property is valued at $16,146.

Cincinnati Machinery Market.

CINCINNATI, May 3.—There has been practically no change in the condition of the machinery market since our review of last month. Where reports from some manufacturers are that business is better, there are some whose orders have not kept up to the level of a month ago. Nevertheless, if any change at all can be noted there is more on the side of encouragement than on the side of unfavorable conditions. Since the first of the year there has been gradual improvement and many of the shops are now running full time if not full handed. The fact that steady improvement has taken place and that there has been no falling off tendency leads to a hopeful view of the future.

Little is done in the way of adding facilities and there is not much to expect in this way for some time to come. During the period of extreme activity there was almost a reckless expenditure of money in betterments of both plants and shop equipment in this city. The plants have been brought up to such a high standard of efficiency that now that the need of conservatism is felt, there is no actual necessity for expenditures along this line. There is but one new plant in the course of construction, and that one was under consideration and the plans practically perfected before the demand for machine tools fell of. Only one plant reports the installation of new machinery.

There will not be much in the way of individual exhibits at the St. Louis Exposition by the machine tool manufacturers but there will be a number of machines exhibited in connection with the products of other exhibtors, mainly electric companies, and some of the shops are putting through or have put through some special machines for exhibition purposes.

There continues to be mention of foreign orders as forming a decided addition to the moderate domestic demand. It is commented upon by one of the large manufacturers that many orders are coming in from the small towns and from small concerns and this class of business is making up the bulk of his demand at present.

The American Tool Works Co. is getting a fair run of orders and is now running full time and almost full force. The company reports a good demand for lathes, a fair run of orders for shapers but rather light orders for drills. Planers are also selling fairly well.

The Lodge & Shipley Machine Tool Co. notes an increase in business this month and regards with hopefulness the outlook for a continuance of at least as good business as at present, with probable improvement. The company will exhibit two new types of its lathes at the St. Louis Exposition and has arranged to make this exhibit in connection with the Bullock Electric Co. and the Northern Electric Co. Mr. Murray Shipley has returned to his official duties after an absence of fifteen months in search of health. He is much improved.

The Cincinnati Machine Tool Co. reports a very satisfactory run of orders this month. The new plant now in course of construction is making rapid progress toward completion and will be an important addition to the many fine machine tool plants in this city. The company will have an exhibit at the St. Louis Exposition in connection with the Northern Electric Co., of Madison, Wis., and the Western Electric Co., of Chicago.

The Bradford Machine Tool Co. is running full time and full force and has a good run of orders now in hand, but new business it not coming in to its liking. Business with this concern, however, is about in line with others in the lathe building business.

The Queen City Machine Tool Co. makes shapers exclusively and is doing a nice business for a new concern. The company is figuring on increasing its line and is looking now for competent department foremen with this end in view. It reports difficulty in obtaining the kind of material it is seeking for this class of service.

Greaves, Klusman & Co. are running full time and full force and have no complaint to make in regard to the way orders are coming in. They have a good foreign inquiry as well as domestic.

The John Steptoe Shaper Co. has orders enough now on

hand to keep the shop running for the next two months. The company is installing a new automatic screw cutting lathe. Foreign orders are reported as quite encouraging.

The Rahn-Mayer-Carpenter Co. does not regard the situation with much confidence. The run of orders is rather small but the company has enough work on hand to keep going.

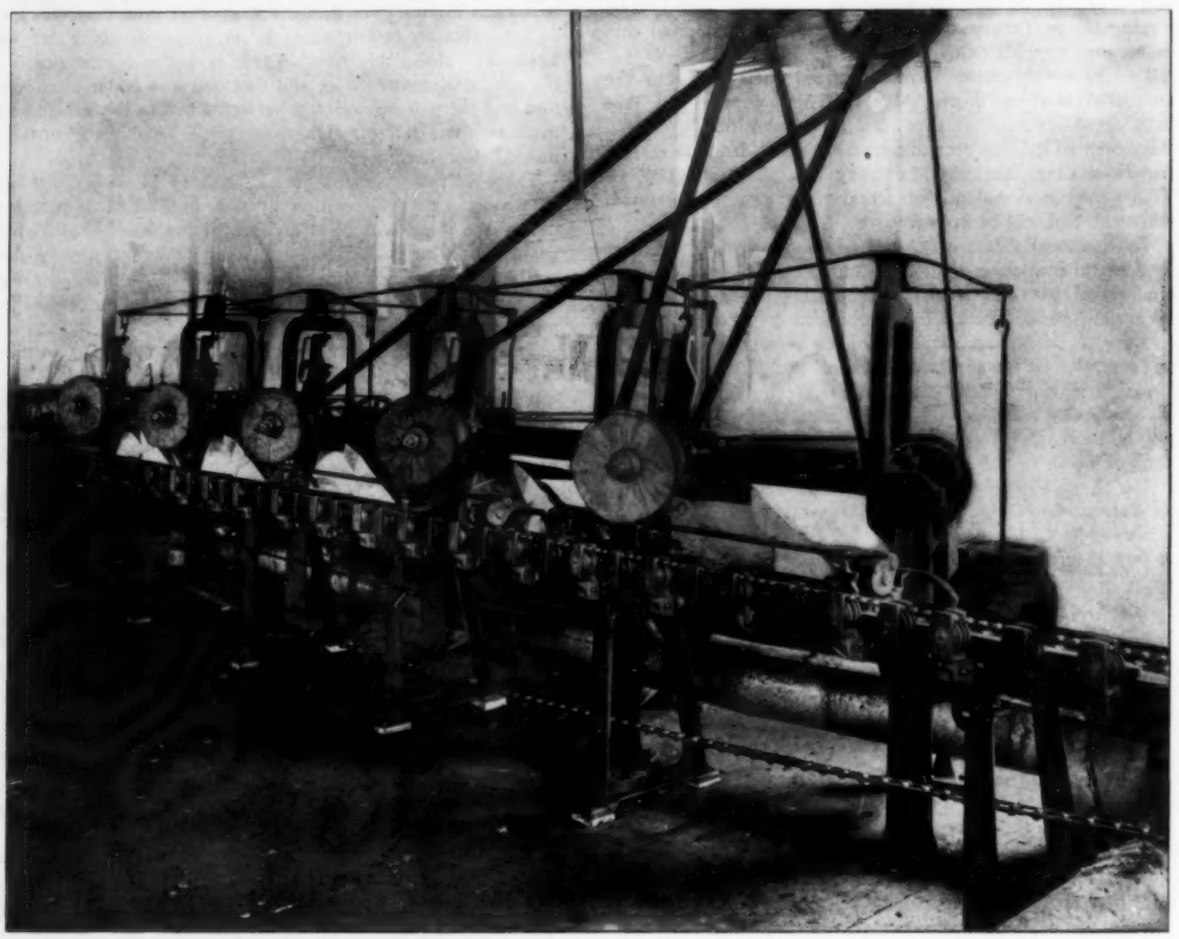
The Cincinnati Milling Machine Co. is running full time now and adding men from time to time. The new business coming in is satisfactory and the month of April was larger than the month of March, which means a good gain, as March was an exceptionally good month. The company will exhibit at the St. Louis Exposition in connection with an electric company. Within the next few months it will have a new No. 5 plain milling machine on the market. At the close of the recent convention of the National Machine Tool Builders' Association, the delegates were invited as a body to visit the plant of the company. A number of the visitors availed themselves of the opportunity. F. A. Geier, secretary of the company, sailed for home on April 29 after an extended trip abroad.

At the St. Louis Exposition, the Philip Carey Mfg. Co., Lockland, O., will have a space 30 x 30 in Machinery Hall, where it is erecting a booth, made by a prominent manufacturer in Cincinnati, of quartered oak finished with fumed oak. The booth itself will be a handsome piece of work, mission style of architecture. The exhibit will comprise the products of the Lockland, Philadelphia and New England plants, including magnesia in its various forms, magnesia steam pipe and boiler coverings, magnesia locomotive lagging, crude asbestos, asbestos fiber, cloth, paper, twine, board, packings, etc., showing the entire line from the crude materials to the finished products. A large space in the booth will be devoted to a small building, showing the various forms of application of the magnesia flexible cement roofing, and its adaptability to different styles of roofs. The exhibits will also include a complete line of the products of the company's roofing and paint factories. All of the boilers, heaters, breechings, pipes and other connections of the power plants, as well as the connections of the private exhibits at the Exposition, have been insulated with this company's 85 percent magnesia steam pipe and boiler coverings.

AUTOMATIC POLISHING MACHINE.

A machine for the polishing of iron and brass tubing, and differing from other styles of machines made by this company, has been recently developed by the Robinson Automatic Polishing Machine Co., of Detroit. The machines of this company heretofore in use by stove manufacturers and others have handled a variety of work, of various sizes and shapes, automatically polishing it as it was slowly conveyed past the buffing wheels, the latter being placed as shown in the illustration.

The tube is placed in a carriage which travels along a track at the rate of four feet per minute, the tubing at the same time maintaining a continuous and uniform revolving motion under the buffing wheels. If the tube is brass, it passes first under a fine emery wheel, which takes out all the imperfections of the tube, then under four buff wheels, which complete the work, giving it a finer luster than is obtained by hand buffing. When polishing iron or steel tubing, emery polishing wheels are used, beginning with coarse emery and finishing with fine emery on grease wheels. The wheels are placed at an angle of about 30 degrees with the tubing.



MACHINE FOR POLISHING AND BUFFING TUBES.

When this machine is run to its full capacity it will polish and buff 2,500 feet of tubing per day. For polishing or buffing of brass tubing, such as is used by manufacturers of brass beds, chandeliers, etc., and of iron pipe, such as is used by gas stove manufacturers, a great economy is claimed.

The Illinois Car & Equipment Co. has ordered the receivers of the Southern Car & Foundry Co. to vacate the plant at Anniston, Ala., owned by the former company and leased by the latter. The receivers had been occupying the premises by consent since April 20, when the lease expired. The order to quit the premises was the result of a petition filed in United States court by the receivers asking for a writ of injunction against the Illinois Car & Equipment Co. restraining it from prosecuting certain claims against the bankrupt concern.

PIG IRON WARRANTS ON PITTSBURG EXCHANGE

The Pittsburg Stock Exchange, at a meeting of its governing board last week, decided to list pig iron warrants of the American Pig Iron Storage Warrant Co., and as soon as rules to govern the handling of these warrants are decided upon they will be listed for trading. It is stated on behalf of the pig iron storage warrant company that furnaces with an annual capacity of 3,900,000 tons have already consented to the establishment of storage yards at their plants, while furnaces with upwards of 1,000,000 tons annual capacity are agreeable to storing some of their iron at certain periods. At a meeting of the securities committee of the Pittsburg Stock Exchange for the purpose of agreeing upon rules to govern the handling of pig iron warrants, the following were suggested and wil probably be adopted without change:

Section 1.—These warrants shall be the issue of the American Pig Iron Storage Warrant Co. Each warrant shall be for 100 tons of pig iron and but one brand of iron and but one grade of iron shall be covered by the same warrant. The standard of a ton shall be 2,240 pounds. Pittsburg delivery or its equivalent, as provided in Section 6.

Section 2.—The warrants shall be divided into the following classes: A. Southern coke iron. B. Northern coke iron. C. Virginia coke iron. D. Bessemer iron. E. Southern charcoal iron. F. Northern charcoal iron. Classes A, B and C shall be divided into grades known as No. 1 foundry, No. 2 foundry, No. 3 foundry and gray forge, if graded by fracture; or No. 1, No. 2, No. 3, and No. 4, if graded by analysis. The basis for analysis shall be the standard adopted by the American Society for Testing Materials. Class D shall be deliverable by analysis only. Class E shall be deliverable by fracture and analysis. Class F shall be deliverable by analysis.

Section 3.—All bids and offers shall be for lots of 100 tons of a certain class and shall be made on a scale of 5 cents. Deliveries shall be made in accordance with the existing rules of the exchange.

Section 4.—All sales or contracts for warrants by classes A, B and C shall be understood to be for No. 2 foundry iron (or its equivalent, as provided in Sec. 5) of a brand recommended by the exchange as a good, merchantable brand.

Section 5.—Any grade of iron whose relative difference in value as compared with No. 2 foundry has been recorded by the exchange, may be delivered in contracts for iron of its class at such difference in price as stands recorded by the exchange at the time of sale.

Section 6.—The equivalent of Pittsburg delivery shall be by warrants for iron stored in warrant yard of the American Pig Iron Storage Warrant Co., less the freight to Pittsburg recorded by the exchange at the time of sale.

Section 7.—The accrued storage on warrant shall be deducted from the invoice at the time of the delivery of the contract.

Section 8.—There shall be kept by the exchange: 1. A record of such brands as are considered good, merchantable brands. 2. A record of the official difference in value fixed by the exchange between No. 2 foundry and other grades that are deliverable. 3. A record of the current freight rates from each warrant yard to Pittsburg.

Section 9.—The commission for buying or selling warrants shall not be less than 6¼ cents per ton where the selling price is below $16 per ton; from $16 and below $21 it shall be 8¼ cents, and for each rise of $5 per ton upward from $21 the commission shall increase 2 cents per ton.

The Meeker Foundry Co., Newark, N. J., successor to S. J. Meeker in the manufacture of malleable and gray iron castings, recently completed its organization, electing the following board of directors: Henry A. Potter, Joseph W. Plume, Bird W. Spencer, E. H. Bonnell, David M. Meeker, Stephen M. Miller and Gardner Meeker. The directors elected the following officers: Henry A. Potter, president; David M. Meeker, vice president; Gardner Meeker, secretary; Stephen M. Miller, treasurer.

The Anniston Stove Foundry, of which C. W. Foushee, of Lexington, Ky., is president and O. W. Snyder, general manager, has completed its plant at Anniston, Ala., and the first range was turned out last week.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

Sealed proposals will be received at the office of the supervising architect, Washington, D. C., until 3 p. m., on the 8th day of June, 1904, for the tanks, pumps, piping, etc., for a crude petroleum burning plant for the boilers in the United States postoffice, court house, etc., at San Francisco, Cal.

D. N. Brown, box 176, Sac City, Ia., is in the market for a No. 3 B. F. Sturtevant steel pressure blower, second hand.

Sprout, Waldron & Co., Muncy, Pa., wants new or second-hand 22 or 24-inch swing, 8 or 10-foot bed, lathe for turning up roll shafts.

W. T. Strong, Ozark, Ala., is in the market for one small cupola furnace, one large lathe, planer, drill press, shaper, shears, punches, steam hammers, engine and boiler or electric motors, etc.

Harper Machinery Co., Park Row building, New York City, wants price f. o. b. Chicago, a standard gauge locomotive crane with three-quarter or one-yard clamshell or orange-peel bucket.

Valdosta Foundry & Machine Co., Valdosta, Ga., will buy second-hand air compressor, 8, 9 or 10 inches.

The Queen City Brick Machinery Co., Traverse City, Mich., has been incorporated with a capital of $15,000.

The Middle West Machine Co., Chicago, has been incorporated with a capital of $10,000, to manufacture machinery. Incorporators are: S. P. Douthart, Arthur T. Symms and Fred A. Krehbiel.

The Fox-Harris Machine & Supply Co., Pine Bluff, Ark., has been incorporated with a capital of $20,000, of which $12,500 has been subscribed. Officers and incorporators are: H. C. Fox, president; J. T. Lloyd, vice president and W. S. Harris, secretary and treasurer.

The Exchange Machine Co., Avondale, Ala., has been incorporated with a capital of $2,000. Incorporators are: T. C. Blanchard, G. W. Hayes and J. C. Forney.

The D. K. Bramble Co., New York City, has been incorporated with a capital of $15,000, to manufacture horseshoers supplies. Incorporators are: Mary L. Bramble, 324 Monroe street, Brooklyn; Silas D. Scudder, 430 West 116th street, New York; and Clarence G. Galston, 45 Central Park, West, New York.

The William J. Wright Co., New York City, has been incorporated with a capital of $10,000, to manufacture boiler cleaners, etc. Incorporators are: Gamaliel C. St. John, 143 Liberty street; George S. Beith Jr., 143 Liberty street; and William H. Wright, 114 West 110th street, all of New York.

The Monarch Traction Co. has been organized at Augusta, Me., for the purpose of manufacturing and dealing in machinery of all kinds, with $1,000,000 capital stock Nothing has been paid in. The president is I. L. Fairbanks, of Augusta.

The Amboy Machine Co., Perth Amboy, N. J., has been incorporated with a capital of $30,000 to manufacture machinery. Incorporators are: John A. Milliken, Brooklyn, N. Y.; James M. Derby, Perth Amboy; Arch. H. Derby, Plainfield, N. J.; and William McMurray, Brooklyn, N. Y.

The Puritan Machine Co., St. Louis, Mo., has been incorporated with a capital of $5,000, all paid, to manufacture the Puritan trade machine and novelties. Incorporators are: Theodore Zesch, Minor E. Hauser and Daniel F. Ruf.

The York Shaft Clip Co., York City, Pa., has been organized to manufacture a new shaft clip, recently invented by Richard Rabie. Promoters and owners are: Thomas J. Young, deputy recorder; ex-Postmaster, David Minnich, and recorder of deeds, E. T. Bentz, who bought the patent right from Mr. Rabie. A site will be selected and work started on the manufacture of the clip at once.

The St. Louis Coin Wrapping & Machine Co., Newark, N. J., has been incorporated with a capital of $500,000, to manufacture coin wrapping machines and registering machines. Incorporators are: William Scully, Brooklyn, N. Y.; Julius O. Venino, Orange, N. J., and Robert D. Beswein, New York.

The South Bend Healy Box Co., South Bend, Ind., has been incorporated with a capital of $30,000, to manufacture and sell

wire-bound boxes and other articles made of wood and metals. Incorporators and directors are: Richard Inwood, Perry C. Lavenburg and Samuel M. Robinson.

The Hennebohle Co., Chicago, has been incorporated with a capital of $50,000 to manufacture machinery. Incorporators are: Herman J. Berghoff, Charles H. Geiger and Henry P. Heizer.

Fires and Accidents:—

The Marion Malleable Iron Works, Marion, Ind., erected three years ago, were damaged by fire April 26. Loss, $12,000.

The W. E. Moss Foundry, Charles City, Ia., was destroyed by fire April 21. The loss is estimated at $10,000; insurance, $2,000.

The plant of the Freeport Spring Co., Sterling, Ill., was destroyed by fire April 24.

The plant of the Phœnix Foundry Co., Chicago, sash founders, was struck by lightning April 23. The resulting fire caused a loss of $600.

Fire at the Lewis Spring & Axle Works, Jackson, Mich., April 20, totally destroyed the spring department. Loss about $40,000; fully insured.

Nearly one-half of the extensive plant of the American Ship Windlass Co., Providence, R. I., was destroyed by fire April 22. The loss is estimated at $100,000, covered by insurance. The company has on hand contracts amounting to $75,000 for work for the Government on machinery to be placed in battleships. Completion of this work will probably be delayed on account of the fire.

Half of the car shop No. 5 of the New York Central railroad at Albany, N. Y., was burned April 27. A number of coaches were destroyed. The loss is about $100,000.

Fire in the plant of the George H. Smith Steel Casting Co., 500 to 516 Clinton street, Milwaukee, Wis., caused a loss estimated at $55,000, partly covered by insurance. About two years ago the company suffered from a fire which almost entirely destroyed the plant.

New Construction:—

The Diebold Safe & Lock Co., Canton, O., has entered into contracts for the new additions to be made to its plant. It has also purchased a new engine, boilers and stoker and some additional machinery aggregating about $45,000.

The Bedell Structural Steel & Foundry Co., New Orleans, La., recently incorporated as successor to the Charles Bedell Structural Iron Works, will enlarge the plant and equip it with modern machinery in order to satisfy the demand which has been steadily increasing in the South.

The Powers-Simpson Co., Powers, Minn., has rebuilt its shops recently destroyed by fire and expects to be in running order again in a few days. Some of the larger pieces of machinery came through the fire without much damage.

The Harrison Machine Works, Belleville, Ill., manufacturers of threshing machinery, have disposed of the site on which their engine and machine shop is located and will shortly begin the erection of a new machine and engine shop which will be located with their other factory buildings. The new building will be about 100 x 50 feet with a 2-story L, 100 x 50 feet. New machinery has already been contracted for.

The plant of the Bettendorf Metal Wheel Co., Springfield, O., will be completely remodeled this summer. The contract for the iron work has been let and improvements were started May 1.

Three new buildings will be erected this summer as an addition to the plant of the Kalamazoo Stove Co., Kalamazoo, Mich. The buildings will be a warehouse 300 x 200 feet, molding shop 280 x 120 feet, and nickel-plating and polishing shop 100 x 120 feet. It is expected that the new construction will be completed by Sept. 1.

Work has been begun on the plant to be erected at Hudson, Mich., by the Globe Fence Co. The contract price for the building is $17,500.

W. T. Strong contemplates establishing an iron foundry, machine shop and plant for the manufacture of plows at Ozark, Ala.

The Valley Wind Engine & Iron Co., Bay City, Mich., has purchased the galvanizing plant of the A. F. Bartlett Co., Saginaw, Mich. The plant will be moved to Bay City and a new buliding will be erected. The company is also erecting another building to be used as a foundry.

The Simpson Hot Air Heater Co., Newark, O., contemplates the erection of a new foundry. The plans for the new addition have not yet been completed.

Charles E. Pease, Dayton, O., has purchased a site on Third street, between Wyandot street and Wayne avenue, for $41,000, and may build a plant for the Buckeye Iron & Brass Works. His plans have not yet, however, been perfected.

The Fulton Foundry & Machine Works, Atlanta, Ga., have increased their capital stock and will erect two brick and steel fire-proof buildings 120 x 340 feet each; one to be used as machine shop and the other as iron, steel and brass foundry.

The St. Paul Roofing, Cornice & Ornament Co., 331 St. Paul street, Baltimore, has awarded the contract for its new building to be located at Dock and Warner streets. The structure will be one story, 40 x 100 feet; brick; concrete foundation; cost about $4,000.

Dietrich Bros., proprietors of Iron Works at 344 North street, Baltimore, have awarded the contract for the erection of a building three stories, 24 x 66 feet; brick front; concrete foundation; galvanized iron cornice to cost about $5,000.

Contracts have been awarded for the new Wanamaker store building to be erected in Philadelphia on the site of the present store at a cost of $5,000,000. The American Bridge Co. will furnish the structural steel.

The Gould Mfg. Co., Seneca Falls, N. Y., is having plans prepared for the enlargement of its foundry and for making other additions to its plant.

Gottleib and Julius Schneider will establish a machine shop at Bluffton, Ind. A two-story building will be erected.

Barnhart & Davis, Warren, Pa., have let the contract for erecting a new foundry and for the equipment of the plant. They will manufacture their own castings, which heretofore have been furnished them by other firms. They manufacture Babbitt furnaces, clutch pulleys, oil thieves and do general jobbing and repair work. They handle large orders, especially in the line of tannery and saw mill work.

The Pittsburg and Valley Districts:—

The Jackson Iron & Tin Plate plant at Clarksburg, W. Va., is to be sold at auction on May 28 by the Security Trust Co., of Wheeling.

No. 1 stack of the South Sharon, Pa., plant of the Carnegie Steel Co. last week broke all previous production records by making 655 tons of iron in 24 hours.

The four tin plate mills of the Whitaker Iron Works, Wheeling, W. Va., were shut down last week for an indefinite period.

During the month of April the blooming mill of the South Sharon plant of the Carnegie Steel Co. produced 24,000 tons of billets.

Heyl & Patterson, of Pittsburg, have secured a contract from the Pittsburg & Lake Erie railroad for the installation of a coal, ash and sand handling plant to be installed at the railroad company's McKees Rocks yards.

Max Solomon, dealer in all kinds of scrap iron and steel, whose offices and yards are located at Beaver Falls, Pa., has opened a branch office at 1209 Park building, Pittsburg.

The bar mill of the Sharon Steel Hoop Co., Sharon, Pa., resumed operations this week after a brief idleness. Two additional heating furnaces have been added.

The Pittsburg Construction Co., Pittsburg, has been awarded the contract for making repairs to the Pittsburg Point bridge. About 700 tons of steel will be required.

Stack No. 2 of the South Sharon, Pa., plant of the Carnegie Steel Co., which was completed a short time ago, will not be blown in for some time. Orders to light the furnace were countermanded at the last moment.

The Mineral Ridge Coal Co., of Youngstown, O., has been incorporated with $15,000 capital. C. W. Ramsey, R. Jeremiah, J. P. Francis, A. J. Miller and E. J. Anderson are the incorporators.

James McNeil & Bro., of Pittsburg, have been awarded a contract for furnishing 6,000 feet of 72-inch steel intake pipe by the city of Toronto, Canada.

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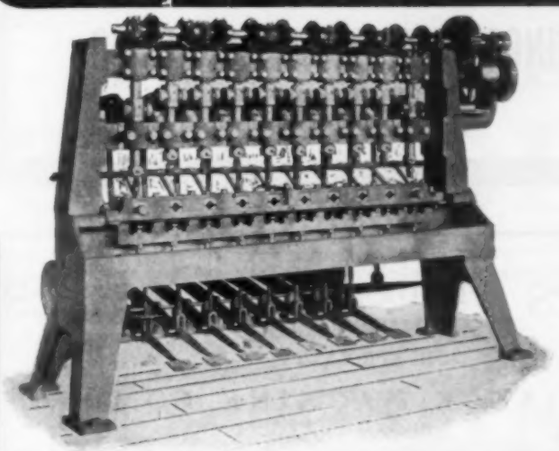

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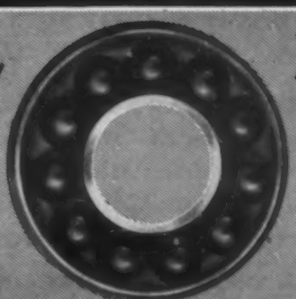

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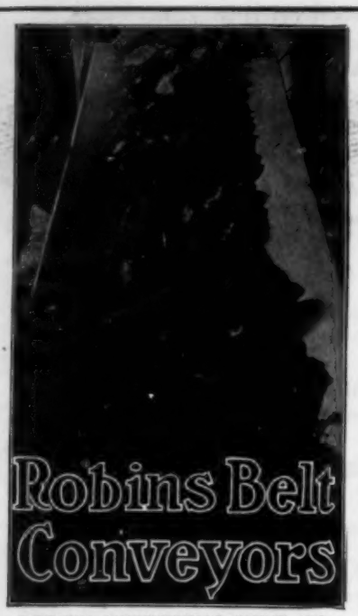

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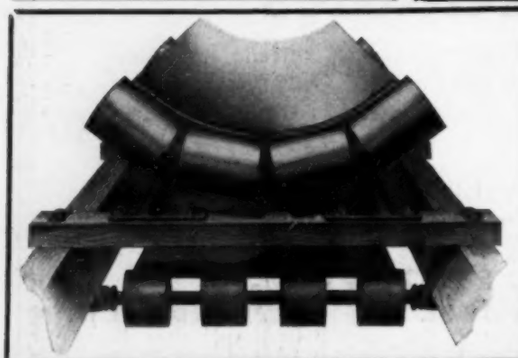

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